Age at First Birth, Fertility, and Contraception in Tanzania

PDF-Version der Dissertation

Dissertation

zur Erlangung des akademischen Grades

doctor philosophiae

(Dr. phil.)

eingereicht an
der Philosophischen Fakultät III
der Humboldt-Universität zu Berlin

von:

Innocent Ngalinda
Masters of Arts in Population Studies
geboren am 5.7. 1962
in Tansania

Präsident der Humboldt-Universität zu Berlin
Prof. Dr. Hans Meyer

Dekan der Philosophischen Fakultät III
Prof. Dr. Hartmut Häussermann

Gutachter: 1. Prof. Dr. Rainer Münz

2. Prof. Dr. Heinz Fassmann

Tag der mündlichen Prüfung: 8.12.98

HUMBOLDT UNIVERSITY OF BERLIN

DEPARTMENT OF DEMOGRAPHY
PHILOSOPHICAL FACULTY III

Doctor of Philosophy

ABSTRACT

AGE AT FIRST BIRTH, FERTILITY, AND CONTRACEPTION IN TANZANIA

by Innocent Ngalinda

The first visible outcome of the fertility process is the birth of the first child. The first birth marks a woman's transition into motherhood. It plays a significant role in the future life of each individual woman and has a direct relationship with fertility. The age at which child bearing begins influences the number of children a woman bears throughout her reproductive period in the absence of any active fertility control. For countries in sub-Saharan Africa, where contraceptive use is relatively low, younger ages at first birth tend to boost the number of children a woman will have. However, even when family planning is widespread, the timing of first births can affect completed family size if contraception is used for spacing but not for limiting fertility.

The birth of a child is an event of great social and individual significance and its importance is recognised in all human societies. It signifies the transition of a couple into a new social status, i.e. parenthood with its related expectations and responsibilities. It marks the sexual and social maturity of the mother and the visible consummation of sexual intercourse .

The relationship between age at first birth and overall fertility in developing countries is generally an underdeveloped area as far as demographic research is concerned. Fertility analysts generally assume that child bearing only occurs within marriage. Then they treat age at first marriage to be a major proximate determinant of fertility. This assumption might have been true in most traditional societies, where births out of wedlock were not accepted and virginity was a prerequisite for marriage. This assumption, however, does not hold true in modern times, where a large number of children is born outside marriage. These facts have been the major motive of conducting the current research.

This study examines the reproductive behaviour of Tanzanian women. The study found the average age at first sexual intercourse to be 16 years; age at first marriage to be 17 years, while average age at first child bearing was estimated to be 18 years. By age 15, almost 10 percent of juvenile women have given birth. This study furthermore found that 41 percent of all first live births resulted from premarital conceptions. Out-of-wedlock births account for 24 percent of all first births in Tanzania according to the 1996 TDHS. The education of a woman, place of residence, and religion play the greatest roles in influencing age at first birth in Tanzania. The striking results were place of residence as it was found that rural residents have a higher mean age at first birth than women living in Dar es Salaam. Dar es Salaam women has the lowest mean age at first birth. Moslems

have lower age at first birth than Catholics. There is also a strong relationship between age at first birth and age at first intercourse also with infant and child mortality. The results indicate that the younger the age of the mother at the birth of the first child, the higher the chances that the child dies.

The study of current levels and trends of fertility showed that, on the average, a Tanzanian woman bears 6 children. Between the 1960s and early 1980s, an average of 7 births per woman prevailed in Tanzania. The declining fertility in Tanzania was confirmed by the analysis of the decomposition of the change of the total fertility rate (TFR) between two TDHSs. It found that natural fertility control is being gradually replaced by contraceptive use although the percentage of women using contraception is still very low. The reduction in infant and child mortality, rising numbers of women attending schools, and a rise in age at first birth are among the factors responsible for the decline in fertility in Tanzania. Education on the other hand has played a major role in raising age at first birth. Education either delays first intercourse and subsequently birth as pregnant schoolgirls are prohibited to attend formal schools or it effects the acceptance of contraception to delay first conception. Specifically, this study establish that there is an inverse relationship between age at first birth and fertility. Marriage is a weak factor in explaining fertility in Tanzania. Women in polygamous unions had fewer number of children ever born than those in monogamous unions in Tanzania. Moslems have a lower fertility than Catholics. Women residing in urban areas have fewer children than those in the rural areas.

Women's education is the strongest predictor of the use of contraceptives in Tanzania. Catholic women are less likely to use contraceptives than Moslems. Tanzanian women residing in rural areas are less likely to use contraception than their counterparts residing in urban areas. Although age at first birth did not show any significance, age at first intercourse, age at first marriage and current age are highly related to contraceptive use.

Variation in age at first sexual intercourse; marriage; and birth, and the extent of practising contraception are found to depend mainly on religion, place of residence, and the age of a woman. It is important therefore to design separate programmes to raise age at first birth and to lower fertility according to the findings related to religion, place of residence, and target juvenile women separately.

Table of Contents

List of Figures

List of Tables

List of Abbreviations

AGI	Alan Guttmacher Institute
AFB	Age at First Birth
AFM	Age at First Marriage
AFSI	Age at First Sexual Intercourse
AIDS	Acquired Immune Deficiency Syndrome
AMREF	African Medical Research Foundation
ASFR	Age Specific Fertility Rate
CBR	Crude Birth Rate
CEB	Children Ever Born
CIS	Commonwealth of Independent States
CMBT	Christian Medical Board of Tanzania
CPS	Contraceptive Prevalence Survey
DHS	Demographic and Health Survey
EA	Enumeration Area
ECA	Economic Commission for Africa
EMAU	Elimu na Malezi ya Ujana
	(Responsible Parenthood Education Project for Youth)
GDP	Gross Domestic Product
GFR	General Fertility Rate
GRR	Gross Reproduction Rate
GTZ	Gesellschaft für Technische Zusammenarbeit
	(German Agency for Technical Co-operation)
HED	Health Education Division
HIV	Human Immunodeficiency Virus
IEC	Information, Education, and Communication programme
IUD	Intrauterine Device
IUSSP	International Union for the Scientific Study of Population
MCA	Multiple Classification Analysis
MCH	Maternal and Child Health
MMR	Maternal Mortality Ratio
MNCEB	Mean Number of Children Ever Born
NFPP	National Family Planning Programme

NRC	National Research Council
ODA	Overseas Development Administration
OLS	Ordinary Least Square
OTTU	Organisation of Tanzanian Trade Unions
POFLEP	Population and Family Life Education Programme
PRB	Population Research Bureau
PSU	Primary Sampling Unit
RC	Reference Category
SDA	Seventh Day Adventists
STD	Sexually Transmitted Disease
STI	Sexually Transmitted Infection
TDHS	Tanzania Demographic and Health Survey
TF	Total Fecundity
TFR	Total Fertility Rate
TM	Total Marital Fertility Rate
TN	Total Natural Marital Fertility Rate
TNPP	Tanzanian National Population Policy
UMATI	Uzazi na Malezi bora Tanzania (Family Planning Association of Tanzania)
UN	United Nations
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
UPE	Universal Primary Education
WAZAZI	Tanzanian Parents Association
WB	World Bank
WFS	World Fertility Survey
WHO	World Health Organisation

Chapter 1

1. Introduction

1.1. Background Information

The United Republic of Tanzania is located in the Eastern part of Africa and consists of the mainland of Tanganyika and the islands of Zanzibar, altogether covering 945,234 km^2, whereas 62,0500 km^2 constitute inland water.[1] Initially, Tanganyika and Zanzibar were two different countries. Tanganyika achieved independence from the British rule on December 9, 1961 and Zanzibar became independent from the rule of the Sultanate of Oman on January 12, 1964. On April 26, 1964, Tanganyika[2] and Zanzibar were amalgamated to form the United Republic of Tanzania.[3]

Administratively, Tanzania is divided into 25 regions. Tanganyika has 20 regions. These regions include Arusha, Kilimanjaro, Dar es Salaam, Pwani, Tanga, Dodoma, Shinyanga, Singida, Lindi, Morogoro, Mtwara, Ruvuma, Kagera, Mwanza, Mara, Iringa, Kigoma, Mbeya, Rukwa, and Tabora. Zanzibar constitute mainly two islands Unguja and Pemba; has 5 regions (Figure 1). Dodoma is the constitutional capital of Tanzania but Dar es Salaam actually remains the commanding post of the policy makers.

Tanzania is a poor country with a mixed economy in which agriculture plays a major role. The economy expanded after independence until the mid-1970s when various factors including droughts, oil price increases, the Tanzania-Uganda war, and the break up of the East African Community cumulatively had a devastating effect. Recently, however, steady growth has resumed. For instance during the period 1985-1990, the annual growth in the gross domestic product (GDP) measured in constant 1976 prices was 3.9 percent (United Republic of Tanzania/UNICEF, 1990). This growth followed

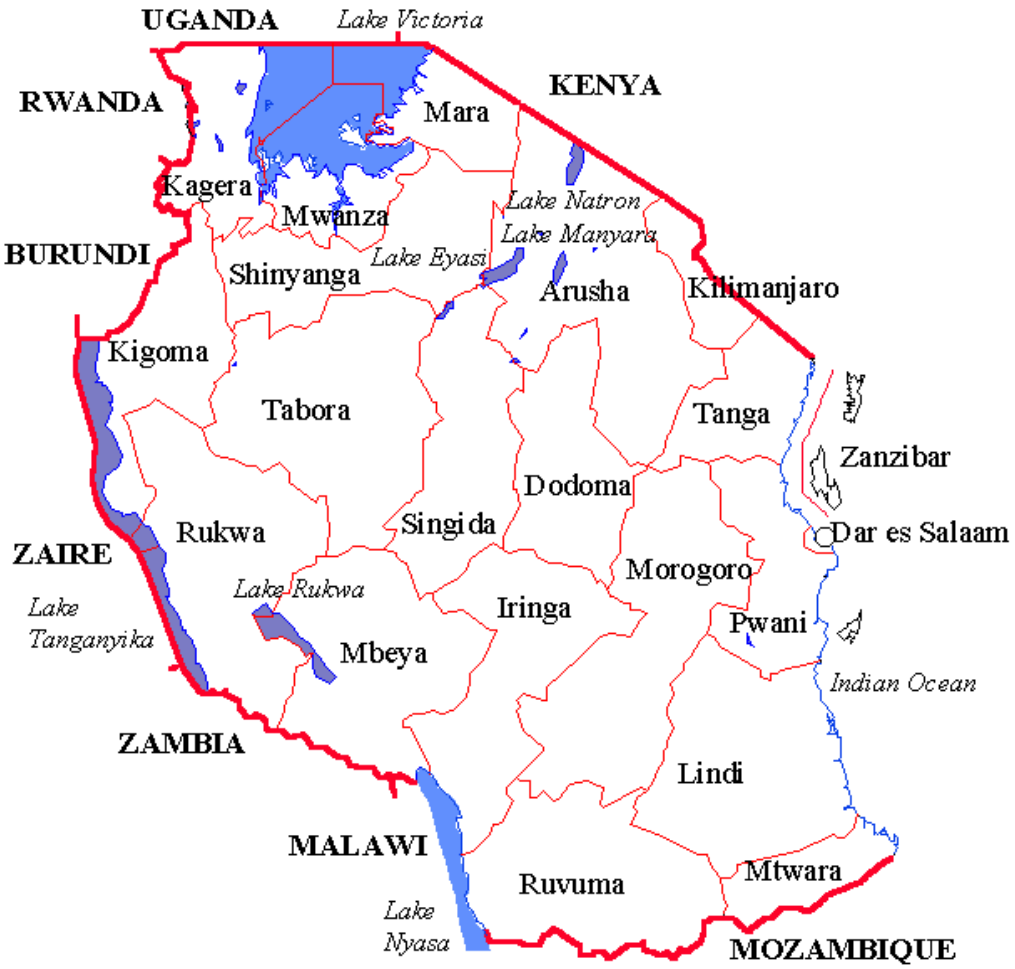
[1]Tanzania has borders with Kenya and Uganda to the North, Rwanda, Burundi, and the Democratic Republic of Congo (former Zaire) to the West, and Mozambique, Malawi, and Zambia to the South. To the East of the Country is the Indian Ocean (see Figure 1.1).

[2] In this study Tanganyika stands for the Tanzanian mainland.

[3] In this study Tanzania stands for the United Republic of Tanzania.

the implementation of structural adjustment policies introduced since in the 1980s. However, Tanzania's economy is highly dependent on imports and the availability of foreign exchange. A shortage of foreign exchange has resulted in a reduction in government budgets, particularly for the education and health sectors.

Figure 1: Map of the United Republic of Tanzania showing administrative regions



Source: http://www.reliefweb.int/mapc/afr_east/cnt/tza/ of October 29, 1998

The population density is 26 persons per km^2 (according to 1988 census), a figure that gives the impression that Tanzania is a sparsely populated country in comparison for instance with Germany. According to the 1998 Population Data Sheet produced by the Population Reference Bureau, Tanzania has a population density of 35 persons per km^2 in 883,589 km^2 while Germany's population density stood at 236 persons per km^2 of 349,269 km^2. However, Tanzanians are unevenly distributed, and some areas are experiencing serious population pressure. This encouraged the government to formulate a population distribution policy which was enforced as long ago as 1969-74, in the second five-year plan (United Republic of Tanzania, 1969). The villagisation programme of the 1970s,[4] the plan to develop Dodoma in order to reduce the importance of Dar es Salaam, and the control of rural-urban migration are among the efforts made by the government towards a more even distribution of the population (United Nations, 1989). However, currently over 80 percent of the population reside in rural areas (Bureau of Statistics, 1994).

The education system of Tanzania has different levels of which some are compulsory. The first level is primary education, locally referred to as foundation education. Almost all primary schools are owned by the state. Primary education is compulsory and the minimum entry age is seven years. Children are supposed to spend seven years in primary school, standard one to standard seven. Enrolment in primary schools rose dramatically after the establishment of the policy of Universal Primary Education (UPE) in 1974 accompanied by the villagisation programme.[5]

The second level in the Tanzanian education system is secondary education comprising two parts: the first four years is called ordinary level and the next two years advanced level. A small number of primary school leavers are selected to join ordinary-level secondary schools (they compete it by doing a standard seven examination), as the

[4]In the 1970s the government moved over 90 percent of the Tanganyika's rural population into villages to make it easier to provide basic social services, e.g. health services, primary schools and clean water supply (United Republic of Tanzania/UNICEF, 1990). This was one of the government's policies based on socialism, equity and self-reliance as stipulated in the Arusha declaration (Nyerere, 1967).

[5] In order to fulfil the target of the government in giving basic education to all, Universal Primary Education was introduced in 1974. It was a reaction to the low school enrolment rate, which was 48.6 percent in 1973. The target of this policy was to gain 100 percent enrolment for all children at school age by 1977 (Muze, 1980).

number of secondary schools is very small compared with primary schools. The government owns most of the secondary schools. Recently, many private secondary schools have been established.

Few students, who succeed at the ordinary-level final examination, are chosen to join advanced-level secondary schools. The number of students joining university and higher educational institutions is a very small proportion of those who started at the foundation level. Despite the commitment of the government, the 1988 Population Census showed that almost 40 percent of the population (10 years and above) are illiterate (Kapinga and Ruyobya, 1994).

There are many religious groups in Tanzania. However, data on their membership representation are not available as questions on ethnicity and religion are considered sensitive and are not allowed to be asked for census purposes although permitted in surveys. In many regions, Christians (Catholics and Protestants) and Moslems co-exist beside traditional believers. Most of the traditional faiths are tribal religions, such as animism, i.e. the belief that objects and natural phenomena possess souls. In Tanzania there are also people without any faith.

General observation shows that in areas where missionaries settled and Christianity is a dominant religion (for instance in the Kilimanjaro region), there are relatively many primary and secondary schools. The literacy rate is higher. According to the 1988 census, regions with more than average percentage of literate population (aged 10 years and above) include Kilimanjaro (81 percent), Dar es Salaam (81 percent), Ruvuma (71 percent), Iringa (68 percent), Tanga (66 percent), Mara (64 percent), Morogoro (63 percent), and Mbeya (62 percent). Shinyanga has the lowest percentage of literate population (48 percent).

Since the independence, Tanzania has conducted three population censuses and three demographic surveys. The censuses were taken in 1967, 1978 and 1988; the first national demographic survey was conducted in 1973 (Henin et al., 1973), and the other two Tanzanian Demographic and Health Surveys were carried out in 1991/92 and 1996. Censuses and demographic surveys are the major sources of demographic statistics in this country, since the registration of vital events is still very incomplete.

From these censuses, the Tanzanian population was found to be 12.3 million, 17.5 million, and 23.1 million in 1967, 1978 and 1988 respectively (Bureau of Statistics, 1994). Tanzanians are now estimated to be 30 million according to the 1998 World Population Data Sheet of the Population Reference Bureau. The intercensal population growth rate between 1967 and 1978 was estimated to be 3.2 percent. With an increase of the population to 23 million by the time of the 1988 census, for the period 1978-88 the annual growth rate was estimated to be 2.8 percent. These figures suggest that the population growth rate has been declining in Tanzania (Bureau of Statistics, 1989; Barke and Sowden, 1992). This decline has been questioned, particularly for the major city of Dar es Salaam. For instance, Briggs (1993) has discussed factors that might have caused the population of Dar es Salaam to be under-counted in the 1988 census. The World Bank puts Tanzania's annual growth rate at 3.1 percent for that period.

These population parameters show that the population of Tanzania grew by about 88 percent in a period of 21 years and population density increased from 14 to 26 persons per km^2 in the same period. If this natural rate of increase is maintained, the population of Tanzania will double to about 60 million in 25 years. Consequently, there might be a great need of reducing this burden of population growth.

In order to tackle the population problems, the government of the United Republic of Tanzania has formulated the National Population Policy. The broad objective of this policy is to reinforce national development by developing available resources in order to improve the quality of the life of the people: 'Special emphasis shall be laid on regulating the population growth rate, enhancing population quality, and improving the health and welfare of women and children. The mutual interplay between population and development shall constantly be borne in mind. Thus, the population policy shall always be the main guide of national development planning' (Planning Commission, 1992:10). The goal of the Tanzania National Population Policy is to reduce the annual growth rate through a reduction in the numbers of births and an increase in voluntary fertility regulation. Therefore, special emphasis is given to the National Family Planning Programme.

Family planning services in Tanzania have a long history. Back in 1959 the Family Planning Association of Tanzania (UMATI) was founded in order to promote child

spacing as a way of enhancing maternal and child health in Tanganyika at that time. During the early day's program services were concentrated in urban areas. However in 1967 the program was extended nation-wide. In 1974 the government became actively involved in providing family planning services by launching the integrated Maternal and Child Health (MCH) programme. This led to family planning services being made available and facilitated by the Ministry of Health. Currently both the government and several non-governmental organisations like UMATI, the Marie Stopes Organisation and many other mushrooming NGOs provide family planning services.

The National Family Planning Program (NFPP) was formulated in 1988 and in 1989 the National Family Planning Unit was established to co-ordinate all family planning activities in Tanganyika. Although the NFPP is under the Ministry of Health administratively, its activities and other population activities are co-ordinated by the Population Planning Unit of the Planning Commission as the overall co-ordinator of population activities in Tanzania.

The major responsibility of the NFPP is the management and distribution of contraceptives to all service delivery points. The initial broad objective of the NFPP was to raise the contraceptive acceptance rate from about 7 percent in 1989 to 25 percent by 1993 (Ministry of Health, 1989).

The plan was that contraceptive acceptance would be achieved through improving the accessibility and quality of Tanzanian family planning services by consolidating past strengths and rectifying weaknesses. The specific objectives of the NFPP were:

- to improve the quality of family planning services through the training of service providers,
- to improve supervision and upgrade the logistics system,
- to improve the accessibility of family planning services by increasing the proportion of health units providing family planning services,
- to improve the general health of mothers and children,
- to raise the awareness of and demand for family planning services.

UMATI continued to work closely with the Ministry of Health (through the NFPP) even after handing over the co-ordination of family planning activities. However, UMATI's

major role (excluding the co-ordination) remained the same: to motivate, educate and inform the general public on the need for child spacing; to train both governmental and NGO service providers; and to procure and distribute contraceptives.

The NFPP operates through different institutions and agencies including the government, parastatal organisations,[6] the private sector, and NGOs (Ministry of Health, 1989). The Population and Family Life Education Programme (POFLEP) under the Ministry of Community Development, Women Affairs, and Children, is a population Information, Education, and Communication programme (IEC) responsible for creating awareness among the people about the relationship between population factors and development. POFLEP also aims at helping people to take action immediately on family planning activities. Another project designed to provide IEC support to the NFPP is the Health Education Division (HED) of the Ministry of Health. The HED helps printing IEC materials for clients in dispensaries, health centres and hospitals. Also, the HED is involved in research in family planning-related problems.

Other implementing agencies of the family planning policy include:

- the Responsible Parenthood Education Project for Youth (EMAU), which is designed to bring about desirable changes in attitudes, behaviour and knowledge compatible with parental aspirations and in conformity with accepted Tanzanian cultural norms and values;
- the Family Health Programme of the German Agency for Technical Co-operation 'Gesellschaft für Technische Zusammenarbeit' (GTZ), which involves the production of IEC materials, and research in and provision of family planning services;
- the Seventh Day Adventists (SDA) church health service, which offers family planning services in its dispensaries;
- the Department of Community Health at Muhimbili University, College of Health Sciences, which is a resource unit for in-service training;
- the Demographic Training Unit of the University of Dar es Salaam, which deals with training, research and consultancy activities in the areas of population, family planning and demography;

[6] These are organisations owned, financed and managed by the government.

- the Organisation of Tanzanian Trade Unions (OTTU), which provides family planning services in its clinics;
- the Marie Stopes Organisation, which provides private family planning services in its clinics;
- the Tanzanian Parents Association (WAZAZI), which trains its regional and district secretaries to educate parents about family welfare, produces educational materials about responsible parenthood, and also conducts research.
- The Christian Medical Board of Tanzania (CMBT) functions as a link between the health care systems of the Dioceses and Churches, and liases with the government.
- Finally, the British Overseas Development Administration (ODA) Family Health Project, which works through the Tanzanian government, aims at expanding family planning services in the Mbeya region.

Tanzania has a network of health facilities including a total of 152 hospitals in 106 districts. At the divisional level, there are about 273 rural health centres. At the ward level, there are about 3,000 dispensaries. At the village level, there are village health posts, estimated to be 5,550 throughout the country. In total, the government provides about 60 percent of health services and the remaining 40 percent are provided by non-governmental organisations. Family planning is included in each of these health institutions mentioned, according to the results of the 1996 Tanzania service availability survey. Despite the efforts by the government and non-governmental organisations to make family planning services available and accessible, contraceptive prevalence among women (15-49 years) is still low. It was found to be 16.1 percent for all women, and 18.4 for currently married women (Bureau of Statistics, 1997).

Out of three processes by which population in Tanzania is changing, fertility and mortality are the most important ones. International migration is negligible except refugees from politically unstable neighbouring countries like Burundi, Rwanda, and the Democratic Republic of Congo. The 1988 population census estimated death rate to be 15 per 1,000, which shows that mortality is slightly reaching a stabilisation stage due

to a fact that Tanzanian is a young population.[7] Therefore, fertility is the major population component that will determine Tanzania's future population growth rate since mortality is declining. This statement might be true if the mortality decline reaches a stage where it cannot decline further than to a level of 10 per 1,000 per annum. In lieu of this fact, fertility decline will reduce population growth rate.

The decline in fertility in every society often proceeds in two stages. The first stage is the decline in fertility due to an increase of age at first birth (natural fertility control). The second stage involves the adoption of contraception and a change in the fertility behaviour. Much attention on stimulating fertility decline has been devoted to the provision of family planning. Thus the first stage of the transition has received less policy attention.

1.2. Research Problem

The first visible outcome of the fertility process is the birth of the first child. The timing of this event measured by the mother's age has strong effects on both individual and aggregate levels of fertility, as well as broader implications for women's roles and social changes in general. Social background characteristics such as religion, place of residence, and the educational attainment are some of the factors that may biologically postpone the onset of the child bearing process.

The first birth marks a woman's transition into motherhood. It has a significant role in the future life of each individual woman and a direct relationship with fertility. It is believed that the age at which child bearing begins influences the number of children a woman bears throughout her reproductive period in the absence of any active fertility control. Therefore the timing of the first birth has important demographic implications, as both the timing of subsequent births and completed family size are related to the age at first birth. For a country like Tanzania, where contraceptive use is relatively low,

[7] Tanzania is termed as a young population country because its population less than 15 years of age accounted for 33 percent of total population in 1988 in comparison with an old population country like West Germany. Before the unification 16 percent of West Germany population under the age of 15 in 1986, while the age group 65 and above were 27 percent. In Tanzania, the population 65 and over were 5 percent of the total population according to the 1988 population census.

younger ages at first birth tend to boost the number of children a woman will have. However, even when family planning is widespread, the timing of first births can affect completed family size if contraception is used for spacing but not for limiting fertility. Several studies have found evidence of faster subsequent child bearing and an increased chance of unwanted births if the first child is born at an early age (Casterline and Trussell, 1980; Finnas and Hoem, 1980; Ford, 1984; Rao and Balakrishnan, 1988). On the other hand, delaying the first birth tends to reduce completed family size. But Turner (1992) in a similar study in Russia found fertility to be low despite early age at first birth and a lack of efficient contraceptive methods. The explanation for this situation may be attributed to abortion. Where contraceptives are expensive and access to abortion is easy fertility might be low. This is based on the assumption that in Eastern Europe couples have an interest in small families, yet women have had little access to or confidence in modern contraceptives. By default, abortion has become the primary means of limiting fertility in many Eastern European countries and the Commonwealth of Independent States (CIS), formerly the Soviet Union (Blum, 1991; Dennehy et al., 1995; Desantis and Thomas, 1987).

The birth of a child is an event of great social and individual significance and its importance is recognised in all human societies. It is of special importance as it signifies the transition of a couple into a new social status i.e. parenthood with its related expectations and responsibilities. It marks the sexual and social maturity of the mother and the visible consummation of sexual intercourse.

Traditionally, procreation was ensured through the institution of marriage. Marriage was geared towards the achievement of large family sizes necessary for meeting its economic, social, and psychological needs. Girls received parental coaching on motherhood and household roles from both their immediate family and the society, popularly known in Tanzania as *Unyago*.[8] As a result, sexual intercourse started after

[8] Unyago means female initiation. Unyago might be equated with the traditional education system which all young girls attend. During this period a young woman is taught how to take care of herself after menstruation, to avoid sexual intercourse before marriage, and how to practise birth control (here the only contraceptive is abstinence as they are taught not to resume to sexual intercourse until a child is more than two years old). Traditionally a girl was allowed to get married after her parents were convinced that she was old enough (i.e. she had started to menstruate, which was the only measure of maturity).

marriage and eventually high age at first birth were achieved and premarital births was avoided. However, many traditional values and social practices have undergone changes during the course of modernisation, and it is likely that the traditional premarital sexual abstinence is on the decrease.

On average, Tanzanian woman marry at the age of 18 (Bureau of Statistics, 1997) although this varies with the level of education, the area of residence, and religion. For example, Reining (1972) in a study of the Haya in Northwestern Tanzania found the average age at first marriage to be between 14-16 years. In most cases fecund Haya women was found to start child bearing immediately after they got married.

It is a fact that girls in Tanzania engage in early sexuality and subsequent early child bearing according to studies undertaken by Uzazi na Malezi bora Tanzania-UMATI (Mpangile et al., 1993). Statistics from the Ministry of Education also show that a large proportion of school girls in primary and secondary schools drop out from school due to pregnancies and early births (Sawaya, 1995). Furthermore, a large proportion of women chooses to remain single nowadays in Tanzania but continue to bear children. Therefore, the concept of the universality of marriage, and births within marriage seems to be a misleading concept in modern times. In Demographic and Health Surveys Comparative Studies it was found that in sub-Saharan African countries 12-67 percent of women experienced intercourse one or more years prior to their first union (Arnold and Blanc, 1990). This suggests that age at first union is insufficient to capture all sexual exposure that leads to births prior to marriage. Moreover, marriage undergoes a shift from arranged marriages to romantic marriages of which sexual intercourse before marriage is a prerequisite. Sometimes these premarital sexual activities result in premarital pregnancies (Gage-Brandon and Meekers, 1992).

The data show a slight rise of median age at first marriage in Tanzania from 17.2 years among women age 45-49 to 19.0 years among women age 20-24 (Bureau of Statistics, 1993). The proportion of women married by the age of 15 declined from 22 percent among those at the time of the survey aged 45-49 years to only 4 percent among women at the age of 15-19 years at the time of the survey. This rise in age at first marriage had only a partial impact on fertility. This is due to the fact that a decline of the total fertility rate (TFR) by one child in 30 years, as discussed above, is negligible. Moreover, it

seems that in Tanzania marriages are not stable now since data from the 1996 TDHS indicates that out of the 25 percent of ever married women between the age of 15 and 19 years, 10 percent are already divorced at this tender age.

The vast majority of Tanzanian women bear children at an early age (Bureau of Statistics, 1993). According to the 1991/92 TDHS data, women who had their first birth below age 15 range between 1 percent for women 15-19 years to 10 percent for women 45-49 years. Furthermore, it was found in the same data that 23 percent of the women age 15-19 were already mothers and 6 percent were pregnant with their first child at the time of the interview (Ngallaba et al., 1993).

Factors influencing age at first birth in Tanzania were classified into biological, social, cultural and behavioural factors (Ngallaba et al., 1993). With modernisation, we expect the age at menarche in Tanzania to decline due to better nutrition and household health. This is likely to initiate early child bearing depending of course on the exposure to sexual relationships and the availability and use of contraception. If deliberate measures to change the current situation are not taken, the prevailing fertility level will persist for many years to come.

1.3. Rationale

Fertility in sub-Saharan Africa is higher than in other regions of the world, with an average total fertility rate (TFR) in excess of six children per woman. Moreover, until the late 1970s, the analyses of the World Fertility Survey (WFS) and other data showed a rising trend in fertility in most countries in sub-Saharan Africa (see for example Cochrane and Farid, 1989). It was believed that these persistently high fertility rates are related to strong pronatalist forces inherent in the kinship system in Africa (Caldwell and Caldwell, 1987; Frank and McNicoll, 1987).

However, analyses based on the Demographic and Health Surveys (DHS) data in the late 1980s, show a declining trend of fertility in several African countries. The most obvious countries where fertility has started to decline include Kenya, Zimbabwe, and Botswana (Arnold and Blanc, 1990; van de Walle and Foster, 1990; Robinson, 1992; Cohen, 1993; Rutenberg and Diamond, 1993). The onset of fertility decline in sub-

Saharan Africa has engendered much interest since it has been suggested that sub-Saharan Africa's fertility transition is different in certain important aspects from that experienced in the past elsewhere in the world (Robinson, 1992; Caldwell et al., 1992b). However, relatively little information is yet available with which to examine this hypothesis.

This study is meant to contribute to understanding African fertility by examining the situation prevailing in one particular country, Tanzania. The government of the United Republic of Tanzania considers the population growth rate (caused mainly by high fertility levels) to be very high. It has been demonstrated also that the rapid population growth in Tanzania has negative effects on the economy, health, education, employment, agriculture, environment and urbanisation (Mturi and Hinde, 1995). It is against this background that the Government of the United Republic of Tanzania formulated the National Population Policy, announced in July 1992, which, among other things, encourages a reduction of fertility (Planning Commission, 1992).

The success of the population policies particularly in Africa however has been doubted. For instance, Kenya recognised the implications of population growth on overall development long before most other African countries started to worry. As a consequence, the Kenyan family planning programme was established in 1967 (Frank and McNicoll, 1987). It was 20 years later that fertility started to decline in Kenya. This implies that more effort needs to be made towards an understanding of the determinants of fertility in African societies so that proper strategies can be formulated. To identify the sub-groups of the population where fertility is relatively high or resistant to decline is a step forward in any programme meant to reduce fertility.

In Tanzania the study of age at first child bearing, fertility and contraception is therefore very timely because of various reasons. It is important to understand when child bearing begins, and what current fertility levels, and factors associated with high fertility levels are in Tanzania so that the impact of the National Population Policy can be assessed. Also, the analysis of new data could be used to give a better understanding of fertility trends in Tanzania in the recent past. In other words, it is important to find out if Tanzania has joined the wave of fertility decline experienced in various African countries and to identify the factors associated with the observed trends.

The Tanzanian National Population Policy (TNPP) document (Planning Commission, 1992) states that the major causes of the high fertility levels in Tanzania are early child bearing and the absence of effective fertility regulation within marriage. Other determinants of high fertility outlined in the same document include: a preference for male children, low levels of education, the low status of women, the large age difference between spouses, and a positive attitude towards large families. All these factors have been found to have a significant effect on fertility in different parts of the world. However, specific studies for Tanzania are rare.

The relationship between age at first birth and overall fertility is generally an underdeveloped area as far as demographic research is concerned, especially in developing countries. In Tanzania for example, most research has concentrated on other determinants of fertility and has ignored age at first birth. Most researchers have assumed that child bearing only occurs within marriage. This assumption might have been true in most traditional societies where births out of wedlock were not accepted and virginity was a prerequisite for marriage. This assumption however does not hold true in modern times, where a large number of children are born outside marriage.

Many scholars have tried to argue that direct effects of early child bearing are seen in the high total fertility and generally young population, the short biographical distance between generations, and a short doubling time of the population. If that is true, there is a need to avoid early child bearing by shortening the reproductive period in delaying age at first birth. The main problem, however, is related to the fact that most Tanzanian women are not using contraception as the 1996 TDHS data suggest. Although 84 percent of all women know of at least one modern contraceptive method, only 12 percent of all women surveyed actually use any of modern methods (1996 TDHS). Therefore, one does not expect 12 percent of the total women population to exert an impact on the whole women population for further fertility decline. This is an indication that the impact of family planning programmes on fertility has been very minimal so far. This is unlikely to change within the next decade unless extraordinary measures will be taken.

Premarital and adolescent fertility have not been adequately distinguished because there is a tendency for them to occur concurrently. A premarital birth or conception can occur at any age within the reproductive period provided the woman has not been married. The feasibility and the nature of public policy that would affect the marital status at child bearing are different from those that would affect age at child bearing. There is a need to identify the magnitude and direction of the relationship between age at first birth and fertility. The high level of fertility in Tanzania can be attributed to both marital and premarital fertility. However, most of the studies done so far overlooked the contribution of premarital fertility. In these studies, based on age at first marriage, births that occur outside marriage were always ignored.

Age at first marriage is often used as a proxy for the onset of women's exposure to the risk of pregnancy, but many women are sexually active before marriage. Therefore the age at which women initiate sexual intercourse marks the beginning of their exposure to reproductive risk more precisely. The median age at first intercourse of Tanzanian women according to the 1996 TDHS is 16.8, that is about one and half years lower than the median age at first marriage of 18.3 years. More data indicate that by the age of 15, 23 percent of the women have had sexual intercourse and by age 18, 65 percent have had sexual intercourse whereas only half had married by this age (Bureau of Statistics, 1997). Therefore, studying the factors associated with age at first birth, its consequences and its contribution to the over-all fertility of the country will help policy makers to formulate better policies in order to fight the current situation. Furthermore, this study will help to expand knowledge about the relationship between age at first birth and fertility in the Tanzanian context. The question as to whether there is a relationship between age at first marriage and age at first birth is an empirical one, which the TDHS data can answer. For these reasons, this study takes a close look at the dynamics of reproductive histories, and especially at the sequencing of events within them.

1.4. Objectives

The ultimate objective of this study is to provide policy makers with useful information for formulating policies on age at first motherhood with the aim to improve the status of women in order to lower fertility. The study also intends to examine the reproductive behaviour of Tanzanian women and to suggest possible measures that can be taken in

order to reduce fertility. Initially, the trend in fertility for the period 1967-1996 is investigated, after which an examination of the contribution of each of the proximate determinants of fertility is carried out. In order to identify the sub-groups of the population with especially high fertility, the social, behavioural, biological and demographic determinants of fertility are analysed.

On the other hand, the length of the interval between the entry into a sexual union and the first birth has important implications for fertility. Since the child bearing process is confined to a period of about 35 years, it may be assumed that early entrance into child bearing will lead to higher fertility in a low contracepting society. Therefore, this study is trying to describe the way in which age at first birth influences fertility, the magnitude of its effects, and its demographic, social, economic and cultural determinants. The study will examine the proximate determinants of age at first birth and its socio-economic and cultural variations as well as the differentials, and consequences of age at first birth in the Tanzanian context.

Due to the importance of contraceptive use in the second stage of fertility decline, as explained previously, it is important to examine the knowledge, needs and use of contraception in Tanzania. The sub-groups of the population with a low acceptance rate are identified along with the related factors. The study also investigates the levels of unmet need and the demand for family planning. Ultimately the major is to find out the proportion of women exposed to the risk of pregnancy, who want to limit or space their births but are not using contraception, and to investigate the characteristics of these women.

Finally, this study describes the larger structure of factors affecting fertility as they operate through age at first birth, and ultimately influence fertility through the intervening variables of reproductive intentions and contraception practices.

1.5. Organisation of the Thesis

Chapter 2 consists of the analytical framework and a literature review. The chapter tries to cover the state of knowledge on the subjects included in the analysis. Chapter 3 describes the sources of the data used along with an assessment of the data quality, and

a brief discussion of the major statistical techniques used in the analysis. In this chapter, the social economic characteristics of respondents are examined. Chapter 4 is the first analytical chapter in which proximate determinants of age at first birth are examined. Differentials in age at first birth are also investigated with respect to background variables. The major goal is to provide policy makers with useful information for improving the status of women and formulating a policy on age at first birth in Tanzania with the aim of lowering fertility. Chapter 5 contains a general overview of fertility levels and trends in Tanzania as computed by using census data of 1967, 1978, and 1988. The second part of this chapter is on analysis of the fertility levels and trends by using the two TDHSs of 1991/92 and 1996. The third part deals with proximate determinants of fertility. The fourth part is about fertility differentials. Differentials of fertility have been mainly examined by using the 1996 TDHS. The reason is that these two TDHSs are nearly 4 years apart and the changes one expects will be minimal. Chapter 6 is on family planning issues. This chapter is divided into three main sections. The first section deals with levels and patterns of contraceptive awareness, and the second section is about contraception. The last section is on unmet need and the total demand for family planning in Tanzania. In this chapter we look at a way of raising age at first birth in order to limit fertility. An important section deals with unmet need and the demand for family planning. Chapter 7 provides a discussion based on factors and consequences of adolescence child bearing in Tanzania. This chapter examines premarital births among adolescents in Tanzania in comparison with other sub-Sahara African countries that conducted the DHS III. We further chose a country in each of the other continents as controls. The last chapter constitutes summary and conclusions.

Chapter 2

2. Analytical Framework and Literature Review

2.1. Introduction

The aim of this chapter is to give an introduction of other scholars' work on the subject matter. The discussion will concentrate on findings based on sub-Saharan Africa. The main focus of this chapter will be the current state of knowledge on age at first motherhood and the fertility change in sub-Saharan Africa. The debate in the literature regarding the onset of the fertility transition in this region is the central issue addressed. The determinants of African fertility are outlined. The discussion focuses on the proximate determinants of fertility putting more emphasis on age at first birth and contraception. This is followed by a review of socio-economic and demographic determinants of fertility and their applicability in sub-Saharan Africa.

2.2. Conceptual Framework

As Davis and Blake (1956) pointed out that cultural, social, and economic settings impinge on fertility through the intermediate fertility variables. There could be biological or behavioural factors that determine exposure to sexual intercourse and hence to child bearing. The relative importance of each variable may differ from one society to another. In particular, fertility is directly determined by intermediate variables. The intermediate fertility variables that will be examined in this study are duration variables measured in terms of the time elapsed before a particular event occurred. The beginning of child bearing which is measured by the age of a woman at the birth of her first child is the dependent variable.

Although age at first sexual intercourse is the first step in the child bearing process, it is closely associated with age at marriage in most traditional set-ups. Hence age at first marriage is always considered to represent the beginning of the exposure to the risk of child bearing. However, in recent days child bearing is not just confined within marriage but is also taking place outside marriage due to prolonged delay in the entry

into unions. In addition, child bearing is now a common phenomenon among adolescents as a result of adolescent promiscuity.

In the past most African societies considered virginity to be essential for the first marriage and premarital pregnancy was a social embarrassment among most ethnic groups in Africa. Today however, this is being accepted as an inevitable consequence of the modernisation process even among the conservative nomadic communities. In the past for example, among the Wanyambo of Tanzania, a girl who became pregnant before marriage was required to confess, and the man responsible was forced to marry her. Today the man responsible is only required to pay a bride price to her parents and to accept supporting the child financially.

However many societies that traditionally condemned premarital sexual intercourse have become much more tolerant nowadays. For example the Baganda in Uganda changed their attitude towards premarital sexual activities. Whereas parents used to control the sexual behaviour of their adolescent children by having them living in the parental home, nowadays they indirectly encourage premarital sexuality by building separate houses for the sexually active adolescents (Ntozi and Lubega, 1990).

The rise of age at first marriage in Tanzania in the recent past as seen in the first chapter can be attributed to several factors, among them are the changing educational policies which are now geared towards boosting women's education. Economic changes reflected by rising standards of living and stimulation of women's employment are beginning to change people's attitude towards early marriage.

As contraception is not widespread in Tanzania, fertility could, among other factors, be mostly determined by age at sexual intercourse as well as the duration of exposure to the risk of pregnancy, age at first marriage, frequency of intercourse, and age at first birth. Behavioural factors that may be modified by the level of education, religion, place of residence may also play a key role in determining fertility. Studies have hypothesised that women who start child bearing at an early age especially in the non-contraception societies are likely to end up with higher completed family size than their counterparts who start at later age provided other fertility depressing factors do not intervene.

Age at first birth as the dependent variable is influenced by a number of factors that could be social, economic, cultural and demographic. Among these are the background determinants and the proximate determinants of age at first birth. Social background has a moderate yet significant effect upon the timing of the first birth, but it seems that education and pre-marital sexual experiences also have a strong influence on age at first birth. Higher education provides women with status or opportunities that reduce the importance of early child bearing. As the use of contraception becomes more prevalent, age at first intercourse will decrease while the age at first birth will vary independently of age at first marriage, and fertility may be lowered.

In this thesis the analytical framework will constitute independent variables which operates through intermediate variables or proximate determinants to influence dependent variables. This study therefore deals with three models. The first model treats age at first birth as a dependent variable (proximate determinants of this model have already been discussed above). The second model is on fertility or rather the number of children ever born which is taken to be a dependent variable (the proximate determinants of the second model will be discussed in the next chapter). Contraceptive use similarly is treated as a dependent variable in the third model.

There are two main proximate determinants of the use of contraception: motivation to control fertility and the cost of regulation. Both operate through a set of socio-economic and demographic variables to affect the use of fertility regulation. At any given point, motivation is regarded as a function of the interaction between the supply of children (actual number of surviving children) and the demand for children (number of children desired). The cost of regulation includes economic costs (money and time), social costs (the outcome of transgressing social norms favouring child bearing), and health and psychological costs (the consequences of experimenting with something new that may be risky or unpleasant).

Factors affecting motivation to use contraceptives include:

i) the desire for children, which is the most direct measure of the motivation for use;

ii) demographic status, which is measured by age and the number of living children. Older women and women with more than five children are likely to be more motivated to use contraception than younger women with low parity.

iii) reproductive knowledge, which is measured by accurate knowledge of the ovulation cycle;

iv) costs and benefits of children, measures related to the costs and benefits of children including education and place of residence;

v) family life values;

vi) exposure to family planning, information, education, and communication (IEC).

However in this study, family life values and the exposure to family planning and IEC will not be examined.

Factors affecting the cost of contraceptive use include:

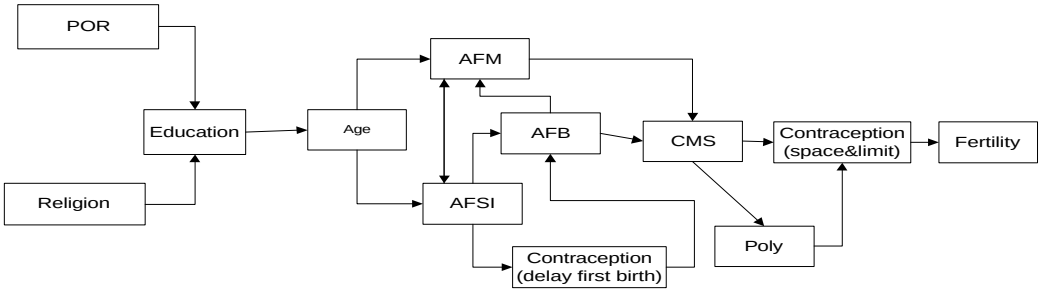
a) economic costs, which is measured by the accessibility of the source and the time taken to reach it, and economic circumstances of the household;

b) normative and psychological costs, which are measured by a woman's own approval of family planning, the number of modern methods of which she approves, her perception that husband and religion approve family planning, and exposure to IEC through various media;

c) social costs, which are measured by spousal communication about fertility and agreement about fertility goals, the influence of relatives on the decision to seek family planning information, and place of residence.

In lieu of these factors the Tanzanian fertility can be analysed by using a simple framework (see Figure 3). Age at first birth is directly linked with fertility as women who enter early into motherhood and are sexually active for a long period in their life have higher fertility than their counterparts who delay their first births. This is well covered by findings discussed in the introductory chapter.

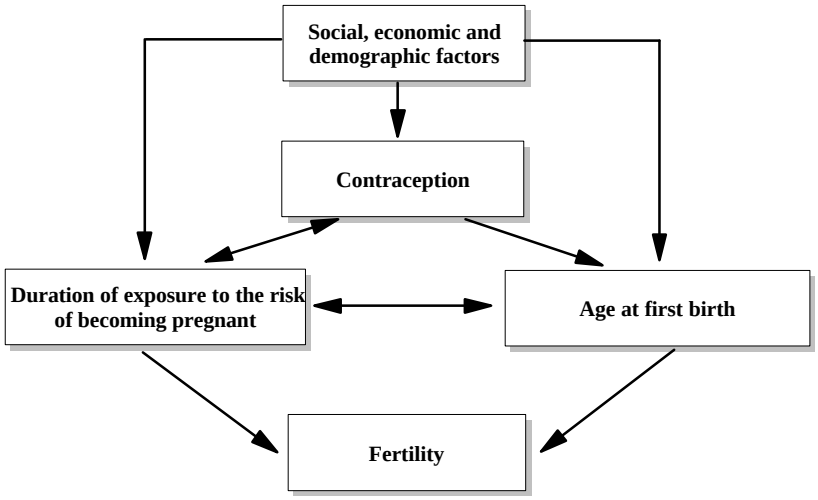
Figure 2: A Conceptual Framework to study Tanzania fertility



Key: POR = Place of Residence
AFM = Age at First Marriage
AFB = Age at First Birth
AFSI = Age at First Sexual Intercourse
CMS = Current Marital Status
Poly = Polygyny

The above Analytical framework can be simplified as follows:

Figure 3: A simplified framework for the study of fertility in Tanzania



The duration of the exposure to the risk of becoming pregnant is conventionally defined as the interval between the entry into the first union and the first live birth. To base this definition on first union or first marriage does not seem to make sense in a modern societal context anymore. Since the number of premarital sexual activities and births increases, marriage or rather first union does not signify the entry into the risk of pregnancy any longer as explained earlier. Whether the entry into sexual relations coincides with marriage is not significant here because we are concerned with the interval between the first sexual intercourse and the first live birth. Prolonging age at

entrance into sexual union will certainly result in lower birth rates. However, early age at first birth will result in high birth rates, other things being equal.

The socio-economic and demographic factors are perceived as determining the timing of birth and the duration of the exposure to the risk of becoming pregnant for those who have entered into sexual relations, which in turn directly influence the age at first birth. Therefore both factors influence fertility. These factors also influence the use or non-use of contraception that in turn influences the birth interval. Early entry into sexual relations with contraception can prolong the birth of the first child. Contraception on the other hand has a negative effect on childbirth hence reduces fertility.

2.3. Literature Review

2.3.1. Age at first motherhood

In the demographic literature, age at marriage has long been regarded as one of the proximate determinants of fertility (Davis and Blake, 1956; Bongaarts, 1982). However the empirical evidence for the effects of age at marriage on fertility is inconsistent (Durch, 1980; van de Walle and Foster, 1990). As a result, the effect of age at marriage on fertility in developing countries remains mostly speculative.

There are two schools of thought on the effect of age at marriage on fertility. Some argue that it has a major impact on fertility because the female reproductive span of life is determined by age at marriage. While this may be true when age-specific fecundability is invariant for changes in age at marriage, others argue that the contribution of age at marriage to fertility may be limited. They assume that a couple, who marries later, will compensate this delay by reducing the birth interval. This latter effect is likely to be of much less importance when age and duration of marriage interact to influence fecundability.

In most situations, age at marriage may have no effect on fertility. First, if women start having children no matter when they marry, then the effect of age at marriage on fertility may be limited. Second, if fertility is controlled within marriage by using

contraceptives or other means, age at marriage may not have much of an effect on fertility because couples may decide how many children they would like to have regardless of the age at marriage. Third, if the level and pattern of fecundability depends upon marriage duration and little on age, fertility is likely to be affected little by age at marriage because a woman, whether she marries early or late, will have the same fertility experience. Although fecundity is related to the age of a woman, it does not depend on age at marriage.

In Tanzania many traditional values and social practices concerning procreation have undergone changes during the course of modernisation. There is evidence that premarital sexual behaviour is on the increase. It is a fact that adolescents in Tanzania engage in early sexuality and subsequently have early births according to the 1991/92 and 1996 TDHS data. It was found that almost half of the women aged 15-19 years had sexual intercourse, 21 percent of all respondents in this age group had at least one birth (Bureau of Statistics, 1993 and 1997). At the same time large proportions of women choose to remain single but bear children. Therefore, it seems that in modern times the concept of marriage being universal and births occurring only in marriage is a misleading concept. Blanc and Rutenberg (1990) found that it was 12-67 percent of women sub-Saharan Africa experienced intercourse one or more years prior to their first union or marriage). This suggests that age at first marital union is insufficient to capture all sexual activities.

A growing number of studies suggest that family wellbeing is conditioned by how soon child bearing begins and how rapidly it proceeds. The complete family sizes appear to be strongly influenced by age at first motherhood. Bumpass (1978) in a study on age and marital status at first birth in the USA came up with a conclusion that both a young age at first birth and premarital first conception might be associated with rapid subsequent fertility. Therefore, he associated adolescent motherhood with rapid subsequent fertility.

The timing of marriage and child bearing appears more recently to be undergoing changes towards the direction of longer delays as revealed by a study done in India (Boom and Reddy, 1986). This implies that rapid rise in age at first birth appears likely for younger cohorts. The Demographic and Health Survey data also reveal that in 14 out

of the 19 sub-Saharan countries studied, the average ages at first birth for women aged 45-49 exceed those of women aged 40-44 (Westoff et al., 1994). In this study, it was found that the average age at first birth for women aged 35-39 is lower than that for women aged 40-44. Thus there seems to be a decline in age at first birth among younger mothers. However, it is possible that this decline could partly be due to the omission of first births or the misplacement in time of first births in the maternity histories reported by older cohorts of women.

Gaisie (1984) in a study on the proximate determinants of age at first birth in Ghana found that low age at first birth persists in the country. A cohort analysis of the mean age at first birth in Nigeria using World Fertility Survey data revealed a declining age at first birth. The study also shows that the major proximate determinants of age at first birth are age at marriage, age at first sexual relations and age at menarche. In the analysis of the Kenyan fertility survey, Konogolo (1985) found that women in Kenya start child bearing early as well. But it is interesting to note that in those provinces, where child bearing started early, fertility was above average. This shows that there is an inverse relationship between age at first birth and fertility.

Women who start child bearing at early ages are likely to have lower levels of education. They are likely to be rural residents or urban poor. Studies have shown that these women would adhere more to traditional patterns of birth spacing that results in long birth intervals and thus reduced fertility (Trussell and Reinis, 1989). Denied access to good medical and nutritional facilities might lead to problems of infecundity, especially of very young mothers. Infecundity would subsequently depress their reproductive potential.

In many countries, education, particularly women's education, has been demonstrated to have a significant effect on fertility. Education brings in a new outlook on life as well as skills for taking advantage of new opportunities. A rise in the level of women's education leads to a rise in age at first birth and consequently to a decline in fertility. Studies done in Latin America have shown that education is probably the most important socio-economic variable associated with greater occupational differentiation and social mobility both of which can affect nuptiality and the reproductive behaviour in various ways (Weinberger et al., 1989).

Women with higher educational levels are more likely to break with traditional patterns including early marriage and child bearing. Education indirectly influences age at first birth, and change in the traditional work role. Women with gainful employment may be more likely to postpone marriage and even child bearing within marriage. Maxwell (1987) in a study of 5,000 US women observed a positive relationship between education and age at first birth.

With regard to education, Gaisie (1984) found that the median age at first birth for women with secondary or tertiary education was 25 years compared to 19 years for the middle and primary school leavers. Similar studies in Kenya by Konogolo (1985) confirmed that post-primary schooling (especially of 9 or more years) has a strong effect in postponing the onset of fertility often by 3 to 4 years.

One of the most important variables for marriage and child bearing can be the influence of religious beliefs and practices, which therefore became important background variables for age at first birth. Studies done in India indicate that Hindus marry and bear children at younger ages than non-Hindus (Bloom and Reddy, 1986). In Tanzania, religion influences age at first marriage and, of course, age at first birth in religions such as the Islam that encourages early marriage. This will ultimately mean early age at first birth. The main reason for this encouragement (for Moslems to marry early) is the emphasis the Islam puts on premarital virginity. However religion can also influence the level of contraceptive use and therefore has an effect on age at first and subsequent births. Some religions like Catholicism have negative attitudes towards the use of modern contraceptives while others for example, Protestantism, have a more liberal stand. In societies where traditional norms and values are fading away, Catholics are likely to have low ages at first birth and short intervals between subsequent births. Thus fertility might be high for Catholics. This statement was confirmed by a study carried out in Sierra Leone by Gage (1986), who noted that Catholics had a lower age at first birth than Moslems.

Place of residence is a useful measure or indicator of the degree of change from traditional or rural behaviour to a modern or urban behaviour. Significant rural-urban differences in marriage and fertility timing are partly the result of the greater impact of

education on age at first marriage, and the incidence of cohabitation and first birth in urban areas in comparison with those in rural areas (Laurie, 1986). Urban marriage, cohabitation and first birth distribution appears to be more dispersed than the rural distributions. Urban women have greater heterogeneity in their marriage and fertility patterns.

Ethnicity is associated with age at first birth, as one of the main functions of culture is to maintain the biological continuity of the members of the society. This fact is supported by Ohadike's argument (1979) that although natural fertility variations are primarily determined by biological process, it might be modified by socio-cultural factors. Every cultural group has its own socio-cultural ideologies of biological functions and their social accommodation (socio-continuities). These ideologies are comprised of the norms, beliefs and values as well as the practices that are likely to affect positively or negatively the reproductive performance of a given society. It is likely that each cultural group may stress certain aspects in their reproductive institutions. These may form peculiar elements that may serve to explain fertility differentials and levels to a greater or lesser extent from the fertility levels of other cultural groups.

In the traditional settings of most Tanzanian societies teenagers are encouraged to marry due to pressure from parents, peer groups and the society as a whole. These societal measures are being changed in order to conform to the government's policy for controlled population growth. It must however be emphasised that the timing of marriage and childbirth still differs among the various ethnic groups in Tanzania. For instance, the inhabitants of the Lake regions and Southern zones marry early and start child bearing at an early age. A point to note here is that the mean number of children ever born to women who are now 40-49 years old is almost the same as in other parts of the country (Bureau of Statistics, 1997). This means that starting child bearing earlier than others does not necessarily lead to a greater number of children than those who start late.

Other things being equal, an earlier age at marriage for women whose first sexual intercourse proceed follow the first marriage, implies either a higher level of life time fertility or a longer period of exposure to the risk of unwanted child bearing once the

desired family size has been attained. The way in which initial fertility is postponed is by delaying marriage and not by using contraception to delay the first pregnancy. Early marriage may result in the delay of a first birth due to sub-fecundity that may be caused by coital frequency, as a woman might not be biologically mature. On the other hand, early marriage may be selective of more fecund women if premarital conception leads to marriage or where premarital conception is a precondition of marriage.

In their study, Marini and Hodson (1981) found that age at first marriage has a causal effect on the spacing of the second birth for those who conceived their first child within marriage. The timing of the first birth however appears to have a casual effect on the spacing between the first and the second birth. Their study also confirmed that as the ages at first marriage and first birth increase the incidence of high fertility after the first marriage (measured by the proportion of having a birth within a given period after marriage) decreases.

In many societies, age at first marriage is practically synonymous with age of entry into sexual relations and thus a major determinant of family formation. In a study carried out in Kenya, Bumpass and Mburugu (1977) noted that there could be a tendency among those with sexual experience for the more fecund to get ‘caught’ by pregnancy and for the less fecund to ‘survive’ the risk of pregnancy. This means that the more fecund women will marry early and be exposed to a higher risk of unwanted pregnancy than their less fecund counterparts who marry somewhat later.

Bumpass and Mburugu (1977) also observed that when marriage and child bearing began early, each subsequent stage of decision making is reached at a less mature age than for women who begin motherhood later. For example, it was noted that women who had their second child in their teenage years had to contracept or to consider the possibility of a third child in a markedly different setting of perceived alternatives than women who reached this stage in their mid-twenties. It is therefore clear that if anything is learned during adolescence that leads women to believe that one or two children could already fulfil their social and personal goals of motherhood, it will not be too late to affect their fertility. Hence, there is a need for sexual education in schools in order to inform girls as soon as possible about family planning measures etc.

2.3.2. Fertility Changes in Sub-Saharan Africa

The study of fertility in sub-Saharan Africa has been an area of interest for at least the past two decades. Since the early 1980s serious efforts were made to try to understand fertility trends and differentials in this part of the developing world. Surveys such as the Contraceptive Prevalence Surveys (CPS), World Fertility Surveys (WFS), and Demographic and Health Surveys (DHS) have made a major contribution to the study of fertility in this region.[9] The major reason for this increasing interest is the evidence of fertility decline observed in different African countries. Although a decline in fertility had not been anticipated for the near future. It has been documented that fertility decline has begun in at least three countries: Kenya, Botswana, and Zimbabwe (Arnold and Blanc, 1990; van de Walle and Foster, 1990; Cross et al., 1991; Freedman and Blanc, 1991; Robinson, 1992; Cohen, 1993; Brass and Jolly, 1993; Rutenberg and Diamond, 1993; Cleland et al., 1994) and parts of some other countries, for example Southwest Nigeria (Caldwell et al., 1992a; Cohen, 1993) and Northern Sudan (Cleland et al., 1994). Compared to Europe or North America it is argued that the African fertility transition is markedly different in certain important aspects to that experienced in pre-modern Western countries (Caldwell et al., 1992a; Robinson, 1992). We will pursue the key arguments of the debate on fertility decline in sub-Saharan Africa in the following paragraphs.

Caldwell and his colleagues, who attempted to explain the factors that influenced high fertility in sub-Saharan Africa, developed a first important concept. The 'wealth-flow' theory (Caldwell, 1976) is among Caldwell's early writings on the theory of fertility decline. The theory asserts that fertility decreases only when there is a change in economic relations. In other words, the level of fertility depends on whether children are a financial asset or a burden to their parents. In industrial societies, children are known to be a financial burden, as education, food, clothing, and entertainment etc cost parents

[9] In addition to the efforts of specific institutions and individuals, the following works are among the examples which show that there is a concern to understand fertility: the work done by the World Bank (Cochrane and Farid, 1989; Acsadi et al., 1990; van de Walle and Foster, 1990), the Ife Conference (van de Walle and Ebigbola, 1987), and the papers and books written under the auspices of the Panel on the Population Dynamics of sub-Saharan Africa of the National Research Council (NRC) Committee on Population (Bertrand et al., 1993; Blesdoe and Cohen, 1993; Brass and Jolly, 1993; Foote et al., 1993; National Research Council, 1993).

a lot. In contrast to industrialised regions, children in traditional societies are generally considered an asset. They help working on the land and are involved in the collection of firewood and water (Caldwell, 1976). They also provide security for their parents when the latter become older and infirm. According to Caldwell, since wealth flows in Africa have continued to be in favour of parents, fertility is not likely to decline. However, one can argue otherwise. Van de Walle and Foster put it this way: 'that children often provide some security for their parents later in life is not in doubt; however, the proposition that parents of large families are better off than those with few children has not been adequately tested' (van de Walle and Foster, 1990: 32).

In the late 1970s Caldwell (1977) further argued that high fertility is economically rational in traditional African economies where land is held by the lineage. An increasing number of direct family members provide the best form of investment available to control the land and its products. This rationality might not be justified any longer. Nowadays there is a tendency that many young people take non-agricultural jobs. This is not only because of modernisation but also because of the increasing number of foreign investors plus the fact of many offspring. The size of the land that a family holds decreases with time. For instance, the increasing scarcity of land in Northern Tanzania meant that landholdings were broken up so that most sons could inherit land. In consequence, land litigation among kinsmen increased, and the value of land in the highlands rose by 700 percent (Maro, 1974, cited in DeLancey, 1990). However, Caldwell (1977) makes the point that even when children take jobs in non-agricultural sectors, the family ties lead them to transfer remittance money to their families. Even though a family does not have much land, having many children increases the chance for parents to do well with the help of their children's remittances. Although the traditional occupational sectors might not be the same as in the past anymore, Caldwell's argument of the rationality of having many children might still hold for the present.

Caldwell and Caldwell (1987) have reviewed ways in which cultural and religious factors in sub-Saharan Africa affect the supply of and the demand for contraception and consequently sustain high fertility. They characterised ancestor worship and the horrors of infertility as fundamental characteristics of the African reproductive system. This point of view, however, has been questioned. It seems there is no direct evidence that

ancestor cults in Africa are still uniformly important to the extent of having a strong impact on fertility. Moreover, childlessness does not have as serious an implication as suggested by the Caldwells (van de Walle and Foster, 1990). In Africa too, life is undergoing modernisation. Old traditional cults and conventions are not as widespread anymore. Effects of modernisation in Africa can be seen in the increasing demand for modern methods of birth control, such as female and male sterilisation (Coeytaux, 1988; Rutenberg et al., 1991; Westoff and Ochoa, 1991; Robinson 1992).

In matrimonial societies, the traditional family structure gives husbands the power of decision making regarding reproduction, while placing most of the economic burden for raising children on mothers (Caldwell and Caldwell, 1987). Women are also responsible for the agricultural production (Boserup, 1985; Frank and McNicoll, 1987). These characteristics have been outlined as the major factors influencing high fertility in most of sub-Saharan African matriarchal countries. The argument is that, since husbands receive the advantages of the status and the prestige from paternity as heads of the household, while not having to bear any economic burden, they opt for a great number of children. As Page (1988) suggests that lowering fertility must be in the interest of those making decision about fertility, it implies that either mothers should be the decision-makers in reproduction or husbands should be economically responsible for their children. There is some evidence that the second option is occurring in Africa particularly in connection with the cost of educating children (Oppong, 1987).

Nevertheless it can be concluded that both the family structure and its consequences for power and decision-making, and the fact that children provide old-age security for their parents are the major socio-cultural factors causing high fertility in sub-Saharan Africa. It has been demonstrated, however, that fertility can decline without changing these conditions. In rural Kenya, for example, fertility declined in the 1980s even though the traditional concepts of family structure, decision making, and old-age security were still the same (Dow et al., 1994). Although Dow found out that fertility in these regions declined, he does not state reasons for the decline.

It seems that until the late 1980s demographers as well as other social scientists were convinced that fertility would remain high in sub-Saharan Africa. Experts assumed that a decline would not be experienced until the forces that support high fertility in the

region were weakened. For instance, Kenya has had one of the highest fertility rates in the world and was believed to have rather poor prospects for a fertility decline (Frank and McNicoll, 1987). However, this country on the whole is currently experiencing a considerable fertility decline. According to the experience of pre-modern societies, fertility in Africa was not supposed to decline, at least not in the late 20th century. The apparent fertility decline in sub-Saharan Africa, therefore, is a new experience, which in a way is a challenge to demographers.

Caldwell et al. (1992a) examined the features of the countries in sub-Saharan Africa where the fertility transition began. They concluded that Africa has a different type of fertility decline than that experienced elsewhere in the world. The common characteristics of Kenya, Botswana, and Zimbabwe include the following: First, they are the only countries in the region that have reached infant mortality rates below 70 per 1,000 live births. Second, they have unusually high levels of education compared to others. And third, they are unique in their high levels of contraceptive practice, ranging between 27-44 percent among married women. However, the predominant feature that marks these fertility declines in these African countries as a possibly new type of demographic transition is the similarity in contraceptive use and fertility decline at all ages (Caldwell et al., 1992a).

With regard to Western countries Knodel (1977) argued that during the initial stages of fertility decline, one should anticipate a larger relative decline in marital fertility rates at older ages since most couples want at least some children during the early years of marriage. As the decline of fertility progresses, this differential between young and old women is reduced (Knodel, 1977). This feature has been widely applicable to pre-modern Western countries.

When analysing the fertility transition in Kenya, Robinson (1992) has concluded that there is a general perception in Kenya that large families are a growing economic burden. This has led to a positive attitude towards family planning and a decline in the desired number of children. Further, the increase in contraceptive prevalence, particularly in modern methods, and the overall increase in the demand for contraception has contributed to the fertility transition in Kenya. In order to make better predictions about other countries in sub-Saharan Africa, Robinson wrote:

‘They [African countries] should continue effects at rapid socio-economic transformation, stressing health, education, and social infrastructure. They should not be obsessed with cultural 'barriers' to demographic change since in Africa, as elsewhere, these seem to have an ability to change and accommodate even while persisting at a formal level. Above all, it seems important to supply family planning services which stress approaches consistent with the tradition of birth-spacing’ (Robinson, 1992: 457).

The study of African fertility trends, however, has been controversial. Due to the absence of a reliable registration system of births, the major sources of data used are not vital statistics but censuses and surveys in which women were asked to report their children retrospectively. These data contain errors due to memory lapse, misreporting and omissions. It has been reported that women omit some of their children and/or misreport their own birth dates or their children's birth dates, both of which affect fertility estimations (United Nations, 1983). The changes in fertility observed during the analysis can be due to these problems and do not necessarily reflect an actual change in fertility. These problems have been minimised in recent surveys, particularly in the Demographic and Health Surveys (Arnold, 1991). However, as argued by Thomas and Muvandi (1994) for the case of Botswana and Zimbabwe, the use of different surveys to study fertility trends in a country may create biases due to different sample compositions. Therefore the study of fertility trends in Africa is not a straightforward exercise.

In Tanzania the average number of children a woman is expected to bear during her child bearing period - Total Fertility Rate (TFR) – was estimated to be 6.6 in 1967, and it had gone down to 5.8 in 1996 (Bureau of Statistics, 1997). If the fertility trend for Tanzania is closely scrutinised, it can be observed that between 1967 and 1996, almost 30 years, the TFR has only declined by one child, a marginal decline.

However, the 1991/92 Tanzania Demographic and Health Survey (TDHS) indicated that by the time Tanzanian women had completed their child bearing years, they had given birth to an average of seven children. The mean number of children ever born to a woman rises steadily with age from 0.3 children at age group 15-19 to about 7.29 children in age group 45-49. It is therefore evident that longer periods of exposure to child bearing lead to higher fertility. However some studies contradict this, for example

data collected in North America and India showed a different trend. It was found that the average number of live births to a woman, whose marriage remained intact beyond age 50, who were not using contraception, and under the same conditions, tended to differ in the average number of children ever born. Women of subgroup of the Hutterites, living in Midwestern North America were found to have an average of more than 9 live births per woman compared to Indian women (6 to 7 live births per woman on average), although the Hutterites marry at an average age of over 21 and Indian women, on average, marry several years younger (UNFPA, 1993).

2.3.3. Proximate Determinants of Fertility

It may seem superfluous to state that a birth is the result of the exposure to intercourse, the successful conception, gestation and parturition. In particular, fertility is directly determined only by a few variables: the intermediate or proximate variables. Any change in individual fertility must occur through an alteration of one, or a combination of several of these variables. The indirect determinants include socio-economic, cultural and environmental variables. The proximate variables provide a link between social, cultural and economic factors on the one hand, and the physiological process which ultimately determines fertility on the other. As noted by Freedman, 'the proximate variables stand between fertility and all other proceeding variables. They immediately determine fertility, and all other variables act through combinations of them' (Freedman, 1986:773).

Davis and Blake (1956) set the stage for rapid advance by formulating a framework in which live births were viewed as the consequences of intermediate factors or more clearly basic biosocial mechanisms affecting the exposure to intercourse, the exposure to the risk of conception, successful gestation, and delivery. Bongaarts (1978 and 1982) has named eight intermediate fertility variables:

i) The proportion of married women,
ii) contraception,
iii) induced abortion,
iv) lactation infecundability,
v) frequency of intercourse,
vi) sterility,

vii) spontaneous intrauterine mortality,

viii) and the duration of viability of the ova and sperm.

Five of these have been identified to be of particular relevance for fertility levels and trends in Africa (Page, 1988):

- proportion of married women (proportional engaged in sexual intercourse),
- lactation infecundability,
- contraception,
- abortion,
- and sterility.

Fertility will be lowered as a result of delaying exposure to intercourse, e.g. through later marriage for those who experience their sexual intercourse in marriages. Other forms of consensual unions, where f.e. the partners do not live together, limits the risk of being exposed to sexual intercourse. Employing sexual practises that reduce the risk of becoming pregnant, such as sexual disruption, can also lower fertility. The use of contraception including abortion, postpartum infecundibility and non-susceptibility due to breastfeeding, and sexual abstinence may on the other hand lower fertility for those who are sexually active.

While the indirect determinants of fertility have relevance for policy makers since they provide mechanisms susceptible to be influenced by official policy, the change in these variables does not necessarily change fertility levels. The direct determinants, on the other hand, influence fertility directly. The change in one or more of these variables changes fertility unless another variable offsets the effect. The direct determinants in a general sense are biological and/or behavioural in nature.

2.3.3.1. Proportion of Women engaged in Sexual Relations

The frequency of sexual intercourse is the underlying variable of interest, but information on this is rarely available. The proportion of women of reproductive age that is regularly engaged in sexual intercourse is believed to be the major determinant of high fertility in sub-Saharan Africa since contraceptive prevalence is still very low (Mturi and Hinde, 1994). Various measures of marital status are used as proxies for this

concept. A few studies have been able to employ direct data on coital frequency (Brunborg, 1983), but so far these attempts have been limited to only a few developed countries. The only sub-group of women whom we can assume to be sexually active is the currently married women.

In the past, marriage was thought to be universal (Bongaarts et al., 1984; Page, 1988), and postponement of first marriage has been outlined as the main determinant of fertility decline observed (Cleland et al., 1994). But marital dissolution through divorce or widowhood is a common phenomenon (Blanc and Rutenberg, 1990).

In studying recent trends in age at first marriage using data from 14 regions in Tanzania, van de Walle observed that the proportion of women never marrying decreases progressively along the age distribution. This influenced him to conclude that 'the Tanzanian data suggest the old norm of universal female marriage may be changing' (van de Walle, 1993: 146).

Furthermore, the definition of marriage is problematic in Africa. Usually marriage in African societies is 'a process'. There is some ambiguity in determining exactly when a couple is getting married (van de Walle, 1993). This implies that the magnitude of the proportion of married women will depend on the indicator of marriage used. The use of the data of the proportion of married women is misleading because there is a rise in premarital sexuality and child bearing in sub-Saharan Africa (Meekers, 1994), which waters down the use of the 'proportion of married women' variable in the study of proximate determinants of fertility.

2.3.3.2. Contraception

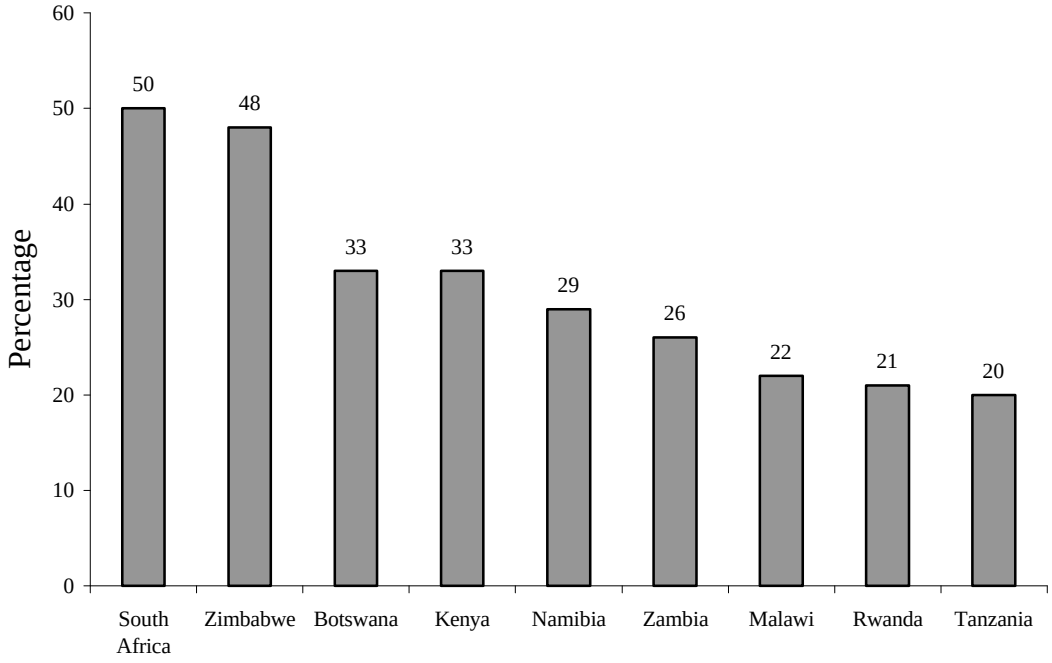
Any deliberate practice undertaken to reduce the risk of conception by sexually active women (and their male partners) is considered as contraception. The tool used to prevent or reduce the frequency of conception is known as contraceptive. Contraceptive use has been described as the most important proximate determinant of fertility (Sherris et al., 1985; Mauldin and Segal, 1988). Robey and his colleagues have shown that differences in the levels of contraceptive use explain 92 percent of the variation in fertility among the 50 countries they studied (Robey et al., 1992). This implies that where contraceptive use is widespread, fertility is low. It is therefore essential to study

the extent of the use of contraception in order to make sensible statements about the current and future fertility rates in a society.

Contraceptive prevalence is lower in sub-Saharan Africa than in other parts of the world. The contraceptive prevalence rates estimated in all African countries were less than 15 percent in 1990 except in Zimbabwe, Botswana and Kenya (Rutenberg et al., 1991; Robey et al., 1992). Moreover the reason given for using contraceptives in many African societies is birth spacing rather than limiting the number of children (Bertrand et al., 1993). It can therefore be argued that low contraceptive prevalence is partly responsible for the high fertility levels in sub-Saharan Africa except in Central African countries with a low contraceptive prevalence rate and low fertility due to pathological sterility. However, the higher rates of contraception to be anticipated in Africa are likely to reduce fertility. Indeed the recent DHS conducted in sub-Saharan Africa has shown an increase in the contraceptive prevalence rate in various countries. For instance in Tanzania, the second and third phases of the DHS show that the contraceptive prevalence rate has doubled from 10 (1991/92) to 12 (1994) percent in less than 3 years (Weinstein et al., 1995).

Figure 4 presents the percentage of currently married women (15 to 49 years) using any contraceptive method between 1986 and 1995. Of the countries in Eastern and Southern Africa, South Africa has the highest contraceptive prevalence rate (50 percent) followed by Zimbabwe (48 percent), Tanzania has the lowest of all countries.

Figure 4: Percentage of currently married women (15-49 years) using a contraceptive method in Eastern and Southern African



Source: Demographic and Health Survey Newsletter, 1997

2.3.3.3. Post-partum Infecundability

The primary cause of prolonged post-partum infecundability is breastfeeding, which results in lactational ammenorrhea. It is known that breastfeeding has an influence on fertility by lengthening the period of postpartum infecundability (Bongaarts and Potter, 1983). In societies where breastfeeding is generally prolonged and universal, and contraceptive use is rare, the primary determinant of birth interval length is the duration of breastfeeding. Breastfeeding leads to the release of prolactin which inhibits the release of gonadotrophin (the hormone which initiates the resumption of the menstrual cycle) (van Ginneken, 1978; McNeilley, 1993). The longer and the more intensive breastfeeding is, the greater the release of prolactin and therefore the greater the contraceptive effect of breastfeeding. Full breastfeeding, where the infant has no other source of food, suppresses it almost totally, whereas less intense and frequent suckling suppresses it partially. Thus ovulation can resume while a woman is still breastfeeding. However, it has been noted that a woman who has stopped breastfeeding is more likely

to became pregnant once ovulation returns compared with a woman still breastfeeding, due to a reduction of fecundability of breastfeeding women (Guz and Hobcraft, 1991).

Lactational infecundability arises after a pregnancy when a woman is unable to conceive until the normal pattern of ovulation and menstruation is restored. Bongaarts and Potter (1983) have observed the period of postpartum amenorrhea to be 1.5 months following the delivery in the absence of any lactation. The average duration of postpartum amenorrhea increases in proportion to the average length of breastfeeding, lasting for about 60 to 70 percent of the duration of breastfeeding where breastfeeding lasts two years and more. For the longest breastfeeding duration's observed in practice, amenorrhea periods of up to two years occur (Bongaarts and Potter, 1983).

Long and intensive breastfeeding is evidently universal throughout sub-Saharan Africa. However, breastfeeding duration varies between countries and particularly within countries. The mean duration of breastfeeding is about 19 months in Lesotho, 18 months in Ghana, 16.5 months in Kenya and Sudan. The corresponding duration of postpartum amenorrhea are 13 months in Lesotho, 12 months in Ghana and 11 months in Sudan and Kenya (Bongaarts et al., 1984). A median duration of breastfeeding of 22.7 months in Bamako, the capital of Mali, corresponded to a length of amenorrhea of 15.2 months. For a period of breastfeeding of 18.5 months in Bobo-Dioulasso (Senegal), amenorrhea lasted 13 months (van de Walle and Omideyi, 1988). The mean duration of breastfeeding observed in Kibaha, Tanzania was between 18 and 19 months and the mean duration of amenorrhea was between 7 and 10 months for different educational groups (Komba and Kamuzora, 1988).

The general observation is that the duration of breastfeeding declines with development. In particular, breastfeeding declines with urbanisation and education (Lesthaeghe et al., 1981c). Therefore breastfeeding is still a potential factor in reducing fertility in sub-Saharan Africa.

The postpartum non-susceptible period is usually defined for each woman according to whichever period is longer, that of postpartum amenorrhea or that of postpartum sexual abstinence (Lesthaeghe et al., 1981b). In many African cultures, the resumption of intercourse is linked with weaning. Breastfeeding and sex are considered to be

incompatible since sperms are believed to poison the mother's milk. Therefore prolonged durations of postpartum abstinence are observed in sub-Saharan Africa. For the countries cited by Page (1988), the duration ranges from 12.4 months (Ghana) to 18.2 months (Benin) with the exception of Kenya which had a duration of 4.1 months. The Yoruba of Nigeria have recorded a duration of about 3 years which means that the sexual taboo lasted longer than the breastfeeding period (Caldwell and Caldwell, 1977). Erosion of the practice of postpartum abstinence has been observed in many areas of sub-Saharan Africa. Bongaarts et al. (1984) noted that in Tanzania in the 1970s, the period of postpartum abstinence rarely exceeded 6 months. However in Kibaha, Tanzania, the period recorded ranged from 8.4 months for women with at least 9 years of schooling to 10.6 months for illiterate women (Komba and Kamuzora, 1988). The most notable observation is that the period of postpartum sexual abstinence is becoming shorter, especially in East Africa, and this is likely to raise fertility. However, the demographic role of abstinence is much reduced by the relative stability of lactation.

2.3.3.4. Induced Abortion

Data on induced abortion, a practice that deliberately interrupts the normal course of gestation, are very rare in Africa. This is due to the fact that in most African countries, induced abortion is illegal unless performed to save the mother's life. It is therefore difficult to assess the effects of induced abortion on fertility in this part of the world. It has been observed, however, that abortion is in fact not uncommon, particularly in urban areas, and that the number of cases presented at hospitals for abortion is increasing though it is restricted to young and unmarried women (Coeytaux, 1988; Justesen et al., 1992). This topic will be discussed in Chapter 4.

2.3.3.5. Sterility

Sterility, whether primary or secondary, has been known to affect fertility particularly in areas where there is high incidence of sterility. In Gabon for example, the key determinant of the exceptionally low fertility (TFR of 4.1) was noted to be widespread pathological sterility (Bongaarts and Frank, 1988). If sterility is reduced, fertility is likely to rise - this is the trend in countries where the prevalence of sterility is high. However, sterility seems to be relatively lower in East and West Africa compared with Central Africa. Bongaarts et al. (1984) have noted that the highest levels of infertility

are found in Central Africa where over a large area more than 20 percent of women aged 45-49 are childless. The percentage of women aged 45-49, who are childless is 12-20 percent and 3-12 percent in East and West Africa respectively. A more recent estimation procedure developed by Larsen and Menken (1991) has shown that prevalence of sterility in Kenya is relatively low compared with other sub-Saharan African countries included in their analysis (Ghana, Lesotho, Cameroon, Sudan). This implies that sterility is still low in East Africa and its impact on fertility is small. This topic will be discussed in Chapter 4.

2.3.4. Determinants of Fertility

The World Fertility Survey (1977) has produced a list of explanatory variables in a simple framework for fertility analysis including:

- the socio-economic structure (health and education levels and facilities),
- the environment (regional and geographical differences),
- the socio-economic and cultural characteristics (migration status, religion, ethnicity, education and income),
- and the biosocial characteristics (nutrition and health, as well as infant and childhood mortality).

These variables affect fertility indirectly through the proximate determinants explained in the previous section. In this study background variables will include education, religion, place of residence, and polygyny.[10]

The spread of education and literacy among women is believed to be fundamental to changes in the reproductive behaviour. The effect of women's education on fertility in less developed countries is found to be curvilinear, i.e. fertility tends to rise first with education and then decreases sharply once a certain level of education is attained (Cochrane, 1979). The argument is that education is positively associated with improved health, lower levels of infertility, abandonment of traditional constraints upon

[10] Later on we will speak of Protestants or Catholics, who live in polygamous marriages/unions. Although the religion and polygyny seem to be incompatible, it is a common practice for many people to identify themselves with a certain religion while not following the doctrine. In this respect one normally finds Christians in polygamous unions while the doctrine insists on monogamous unions.

sexual behaviour and the practice of breastfeeding, all of which are known to raise fertility levels. As the educational level increases, marriage tends to be postponed which causes a negative effect on fertility and counteracts the initial effect of fertility increase. Moreover, educated women desire relatively fewer children. They have high contraceptive prevalence and a high chance of working outside their homes. All of these factors are known to lower fertility levels (Cochrane, 1979). However, there is also a possibility of the reverse causation which is less documented, i.e. the initiation of child bearing causing the termination of education (Cochrane, 1979). While analysing the relationship between fertility and the level of education in sub-Saharan Africa, Cohen (1993) has shown that fertility is either curvilinearly or negatively related with education but does not appear very responsive to few years of education.

Generally, fertility is higher for women residing in rural areas compared with those residing in urban areas. Higher levels of education, occupation, a more modern environment, aspirations for higher levels of living are among the factors which can cause fertility among urban women to be lower than among rural women (Stolnitz, 1983 cited in Bulatao, 1984). Also, it is assumed that urban women have a better knowledge of and access to modern contraception than women in rural areas (Cohen, 1993). A recent demonstration has shown that rural fertility is substantially higher than urban fertility in every African country included in the analysis (Cohen, 1993).

Education and occupation of the husband (or the partner) can be used to measure the socio-economic status of a family, and is also an indicator of the quality of child rearing if more appropriate variables such as income are not available. The basic assumption is that the higher the educational level of the husband and his occupational status, the higher the income of the family. This leads to improved living conditions. Bulatao and Lee have argued that,

‘In principle, whether children are net producers or net consumers, higher income or greater wealth should make them more affordable and therefore increase demand for surviving children, with a subsequent increase in the number of desired births. However, income increases may lead to a demand for higher quality children rather than a large number’ (Bulatao and Lee, 1983a: 767-768).

In various societies religion has been found to have an impact on fertility. Lucas (1980) has argued that Moslems often have higher fertility than non-Moslems, and Catholics frequently a higher fertility than other Christians. While the Catholic doctrine is argued to be pronatalist by favouring large families and rejecting all efficient methods of birth control, Moslems have high fertility because of early and universal marriage. Also the majority of Moslems live in traditional agricultural societies where children are economically useful and levels of education are relatively low (Lucas, 1980). However as a society develops, the fertility differentials by religious groups are expected to become smaller.

It is generally argued that polygyny enhances child spacing in most African societies (Schoenmaeckers et al., 1981). For instance female abstinence can be maintained more easily in a society that practises polygyny. The Tanzanian experience has shown that pregnancies are more frequent among women living in monogamous unions than those in polygamous unions (Henin, 1979). On the contrary, it has been argued that polygyny is negatively associated with contraception (Caldwell and Caldwell, 1981) and women married to the same man can compete to bear children particularly in societies where the status of a woman depends on the number of surviving children. Therefore the effect of polygyny on fertility can be in either direction.

3. Data and Methodology

3.1. Introduction

The aim of this section is to state the sources of the data used in the analysis and to attempt an assessment of the data quality. Secondly, the methods of analysis applied to the data are described. In the assessment of the data, standard methods of checking data quality are used. The important ones are the extent of heaping of respondent's ages, the errors in reporting the number of births, birth history and the extent of imputed birth dates. An attempt is also made to assess the accuracy of data in reporting maternity history.

3.2. Source of Data

The major sources of data in this study are the Demographic and Health Surveys so far conducted in Tanzania. The first TDHS was conducted between October 1991 and March 1992 under the second phase of the Demographic and Health Survey (DHS) programme. The second TDHS was conducted between July and November 1996 under the third phase of the Demographic and Health Survey (DHS) programme.

The main objective of all two TDHSs was to collect information on fertility, family planning, and general health. The survey was planned to provide estimates for urban and rural areas and of course for the whole country. The two surveys used the 1988 census information as the basic sample frame. The reason given for the choice of the 1988 census frame was that it provided a list of enumeration areas (EAs) that had well defined boundaries and a manageable uniform size (Bureau of Statistics, 1993 and 1997). EAs were used as primary sampling units (PSUs). In each region of Tanzania, the sample was designed to be self-weighted in each region in Tanganyika (20 regions). For the case of Zanzibar, five regions were grouped into two regions for this purpose, i.e. Pemba and Unguja. In each region, the sample of the EAs was proportionally distributed according to its urban and rural size.

All surveys used a three-stage sample. The primary sampling unit were the wards or branches, EAs were systematically selected with the probability proportional to size. In the second sampling stage, two EAs per selected rural ward or branch and one EA per selected urban ward or branch were chosen with probability proportional to size. All surveys selected 357 EAs of which 95 were from urban and 262 in rural areas (Bureau of Statistics, 1996: 178). The survey involved randomly selected women at the age between 15-49 in selected households. The target population of the 1991/92 and 1996 TDHS were 7,850 and 9,000 women (15-49 years) with completed interviews. By assuming that not more than 20 percent of the households will be uncovered, the total sample of selected households was 9,560 in 199/92 and 9,000 in 1996. The total number of persons in the households was identified before the field work (listing).

The sampling procedure can be obtained in the analysis volume for the 1996 TDHS but mathematically, the first stage sampling was implemented by using the following relationship:

$P_1 = (w_h M_{hi})/M_h$

Where P_1 = the first stage selection probability

w_h = the number of wards or branches selected in a particular region

M_{hi} = the measure of the size of the i-th selected ward or branch

M_h = the measure of the size for the region under consideration.

$P_2 = (w_{hi} M_{hij})/M_{hi}$

Where P_2 = the second stage selection probability

w_{hi} = the number of EAs selected in a particular ward or branch

M_{hij} = the measure of the size of the j-th selected EA

M_{hi} = the measure of the size for the ward or branch under consideration.

Hence $P_3 = b/L_{hij}$, where b is either 20 (urban) or 30 (rural) and L_{hij} is the number of households listed in the j-th selected EA according to the final analysis of 1991/92 and 1996 TDHS.

Four types of questionnaires were used in the first survey, namely: service available questionnaire, household questionnaire, female and male questionnaires. In the second survey, all types of questionnaire were used except the service available questionnaire which was conducted as a different survey. The household questionnaire listed all usual

residents of the household as well as visitors who slept in that house a night before the interview day. This questionnaire was used to collect socio-economic data as well as to identify women and men eligible for the individual interview. Basic information was collected on characteristics of each person in the household including their relationship to the head of household, age, sex, educational background, and place of residence. Socio-economic data included the source of water, type of toilet facilities, materials used for the floor of the house, and ownership of various durable items like radios, television sets, refrigerators, bicycles, motorcycles and cars. A total of 9,238 women (96 percent of the eligible women identified) aged between 15 and 49 years were successfully interviewed in the 1991/92 TDHS. The household response rate was 97.2 and individual response was 88.9 percent (Bureau of Statistics, 1993). A total of 8,900 households were selected for the 1996 TDHS sample, of which 8,141 houses were occupied at the time of the interview. The household interview was completed in 7,969 households (98 percent of occupied households). In the interviewed households, 8,501 women were identified as eligible (15 to 49 years) for individual interview. A total of 8,120 women (96 percent of the eligible women) were successfully interviewed in all 25 administrative regions of Tanzania (Bureau of Statistics, 1997).

The female questionnaire was used to collect data from women 15-49 years old. Information was collected on background characteristics of a woman including reproductive history, knowledge and use of contraceptive methods, fertility preference, antenatal and delivery care. Data was also collected on sexual activities, marital status, employment status, on child survival information, breastfeeding and weaning practices, vaccinations, height, weight and the health status of children under five years. Topics like the awareness of HIV/AIDS and STDs as well as maternal mortality, female circumcision were also included.

The male questionnaire had the same features as the female questionnaire except for questions on reproductive history, maternal and child health. Approximately one third of the households were selected for the male questionnaire, out of which 2,658 eligible men for the individual interview were identified. A total number of 2,256 (85 percent of the eligible men identified) aged between 15 and 60 years were successfully interviewed. In this study we will not deal with the male questionnaire.

The population census data will supplement the TDHS data particularly in studying fertility trends. The three Tanzanian post-independence population censuses were conducted on August 27 or 28[11] in 1967, 1978 and 1988 respectively for both Tanganyika and Zanzibar. These censuses are the major source of mortality and fertility statistics in the country since registration of births and deaths is very incomplete in Tanzania. Usually the questions asked during the censuses were similar to the TDHS questions with minor modifications. Therefore, the census data are expected to be comparable with the TDHS.

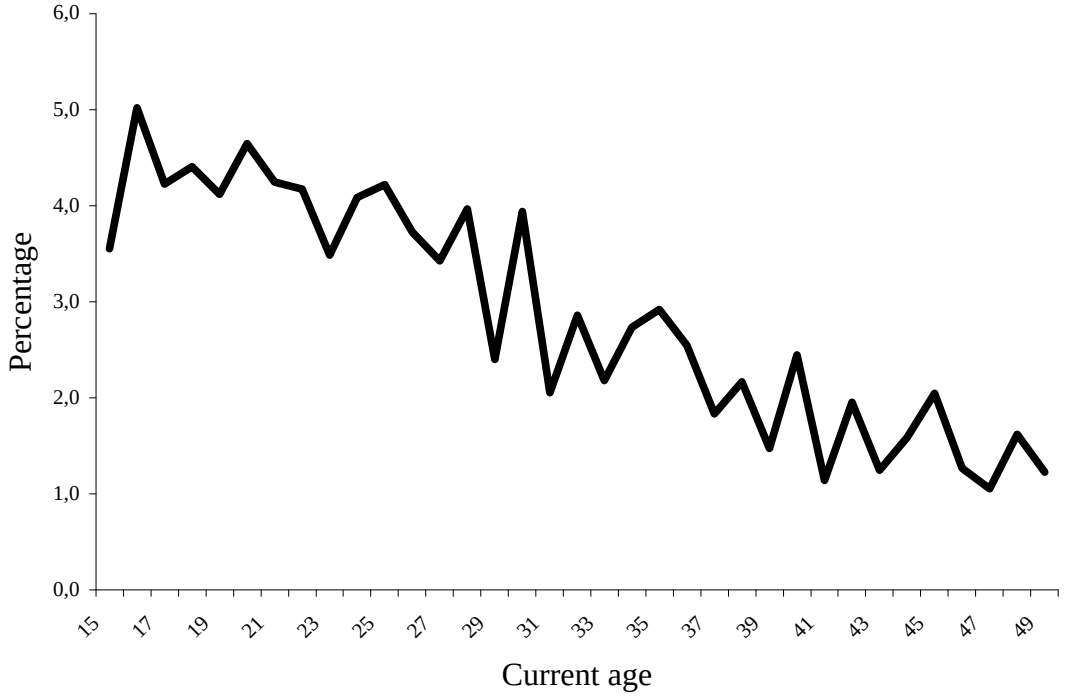
3.3. Data Quality

Major problems associated with retrospective data that could affect fertility estimates include the accuracy of the respondents' age, reported on the individual questionnaire and the quality of birth history data. This section deals with these non-sampling errors as reported in the female questionnaire.

The age distribution of women by single years of age is given in Figure 5, according to the information on age obtained from the female questionnaire. A common feature of such age distributions in censuses and surveys in developing countries is heaping on ages ending with 0, or 5, and to some extent those ending with even numbers. The TDHS is no exception. A marked heaping at ages ending with 0, 5, and even numbers is clearly seen. It can be observed that many women are concentrated particularly on age 16, 20, 28, 30, 32, 38, 40, 42, 45 and 48. But the heaping is not serious although one must be cautious when performing any analysis that involves women's age. The problem of heaping in particular ages can be partly reduced by grouping women in five-year age groups as shown in Figure 6. It can be observed from the figure that age distortions have been smoothened to a large extent compared with Figure 5. The percentage of women decreases consistently from age group 15-19 to age group 45-49.

[11] The choice of the date depended on the day it was Sunday around 28 of August.

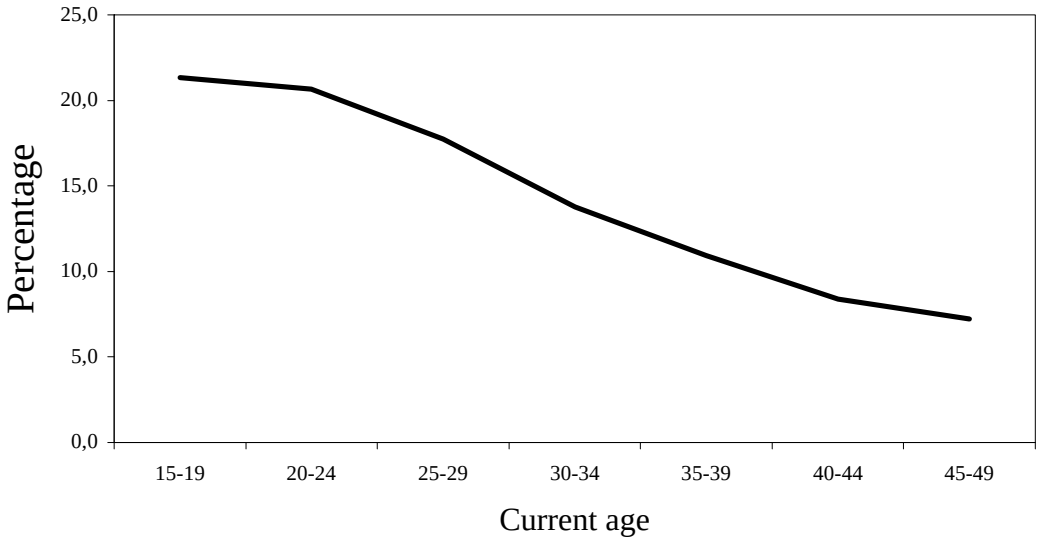
Figure 5: Percentage distribution of women by current age in single years



Source: calculated from 1996 TDHS

There is some evidence that interviewers 'displaced' women at the age of 15 and 49 outside the eligible age range (15-49) presumably in order to avoid the need to interview them. The number of women at the age of 15 is substantially lower in both surveys than 14 and 16. The number of women at the age of 16 reported (488) is higher than that reported of women at age 15 (425) in 1991/92. In 1996 too, the number of respondents age 16 exceeds the number of respondents age 15 by 116. At the end of the range, the number of women aged 49 is lower than aged 50 for both surveys which indicates a deliberate move to avoid a backlog of interviewing. In the comparative study of the DHS, Rutstein and Bicego (1990) noted some similar displacements out of the eligible age range.

Figure 6: Percentage distribution of women by five-year age groups



Source: calculated from 1996 TDHS

It is important to look on the completeness and accuracy of information on births as this can also be used to ascertain the quality of data. Figure 6 shows the percentage distribution of births by calendar year to ascertain if any unusual pattern exists which may indicate that births have been omitted or that the ages of children have been displaced. The percentage of surviving children with known month and year of their birth in the 1996 TDHS is 92 percent. For children who died the percentage is 82 percent, bringing the total to 90 percent (table 2).

All in all, in many surveys that include both demographic and health data for children below a specific age, age displacement is common. It is also difficult to measure the extent of displacement but the examination of the year of birth distributions of children helps to identify whether displacement is a significant problem. A close look at Figure 7 shows deficits of births in 1991 and a surplus in 1990. This could be due to a deliberate attempt by some interviewers to reduce their workload, in particular to shorten the interview by skipping the health section that contains extensive questions about children under five. This might have been possibly due to the fact that the cut-off date for asking health and breast-feeding questions was January 1991 (Bureau of Statistics, 1997).

Figure 7: Distribution of births in calendar year

Source: calculated from 1996 TDHS

Table 1: Percentage distribution of respondents and siblings by years of birth

Year of Birth	*Respondents*	*Siblings*
Before 1945	0.0	2.7
1945-49	3.9	3.4
1950-54	8.1	6.0
1955-59	9.4	9.3
1960-64	13.4	12.4
1965-69	16.0	14.6
1970-74	19.8	15.6
1975 or later	29.4	36.2
Total	100	100
Lower range	1946	1915
Upper range	1981	1996
Median year	1969	1970
Number of cases	8,120	47,705

Source: calculated from 1996 TDHS

Another measure of the quality of data is to examine the percentage distribution of respondents and their siblings by year of birth. If there is no bias, the year of birth of siblings should be nearly equivalent to the year of birth of respondents overall (Table 1). This table shows that the distribution of respondents and their siblings by year of birth is very similar. The median year of birth is about the same, 1969 for respondents and 1970 for siblings. This indicates that there was no serious underreporting of siblings.

Table 2: Percentage distribution of birth with reported year and month of birth by calendar years for surviving, dead and all children

Year	*Percentage with complete birth date*		
	Surviving	Dead	Total
1996	98.5	87.4	97.4
1995	96.3	88.2	95.3
1994	96.0	90.0	95.2
1993	97.3	88.3	96.2
1992	92.7	85.1	91.4
1991	92.6	86.7	91.7
1990	91.8	81.4	89.9
1989	94.7	81.8	92.5
1988	90.4	86.8	89.8
1987	92.7	84.0	90.9
1992-96	96.1	87.5	95.0
1987-91	92.4	84.0	90.9
1982-86	90.6	80.2	88.7
1977-81	88.7	77.2	86.6
before 1977	85.8	75.4	83.2
All	92.0	81.5	90.2

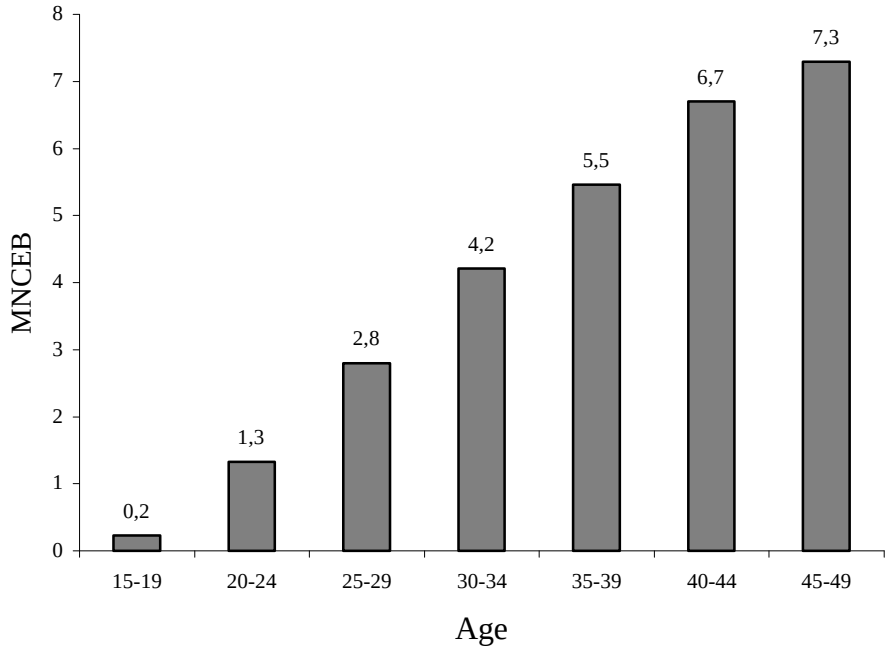
Source: calculated from 1996 TDHS

Table 3: Mean number of children ever born by age group of women

Current age	*MNCEB*
15-19	0.23
20-24	1.33
25-29	2.80
30-34	4.21
35-39	5.46
40-44	6.70
45-49	7.29

Source: calculated from 1996 TDHS

Figure 8: Distribution of mean number of children ever born by age



Source: calculated from 1996 TDHS

A general picture of the coverage of the number of live births can indicate whether the information on births contains no serious errors and whether it can be used in the analysis. This can be obtained by looking at the average number of children ever born by five-year age groups of women. Figure 8 shows that the mean number of children ever born increases monotonically with age, even at older ages where memory lapse is expected to be higher.

The information on the age at first birth of a respondent is obtained by subtracting the respondent's date of birth from the date of birth of her first child can be used to asses the quality of data. This is due to the fact that the accuracy of information on the age at first birth depends on the accuracy of the information of the respondent's birth date and the date of birth of her first child.

Table 4: Percentage distribution of mothers by completeness of information on date of first birth by age group

Broad age groups of respondents	*Year and month reported, no imputation*	*Year reported month imputed*	*Age reported, year and month imputed*	*No information, year and month imputed*	*N*
20-29	90.8	8.8	0.1	0.3	2,921
30-39	75.2	23.9	0.3	0.6	2,096
40-49	58.2	39.8	0.2	1.8	1,363
Total	**80.2**	**19.0**	**0.2**	**0.7**	**6,887**

Source: calculated from 1996 TDHS

The completeness of reporting date of first births in Tanzania is 80.2 percent. The reporting of the date of first birth is less complete among older women than among younger women. This pattern probably reflects the difficulty of recalling births that occurred many years ago and the relatively low levels of education of the older respondents (Croft, 1991). Table 4 shows a decrease in the completeness of reporting with age. 58.2 percent of women 40-49 reported a complete date of their first birth compared to 90.8 percent of women age 20-29. The date of first birth for older women, therefore, required more imputation than that for younger women. In the surveys conducted in sub-Saharan Africa, with the exception of Kenya (DHSI, II), Malawi, Namibia, Rwanda, and Zambia, more than 25 percent of first births to women aged 40-49 required some imputation (Saha and Mboup, 1992).

The quality of data on the date of first birth is further examined by comparing the proportion of women who ever had given birth to a child at the time of the survey to the proportions at 5, 10, and 15 years prior to the survey. It is expected that the proportions would decrease or remain stable over time. A trend towards increasing proportions in intervals close to the survey date would indicate a tendency for older women to shift the date of first birth further back in time than it really occurred, assuming that there has been no differential omission of first births by age group.

Table 5: Percentage of women who had their first birth at ages 15-19 and 20-24 for selected years prior to the 1996 TDHS

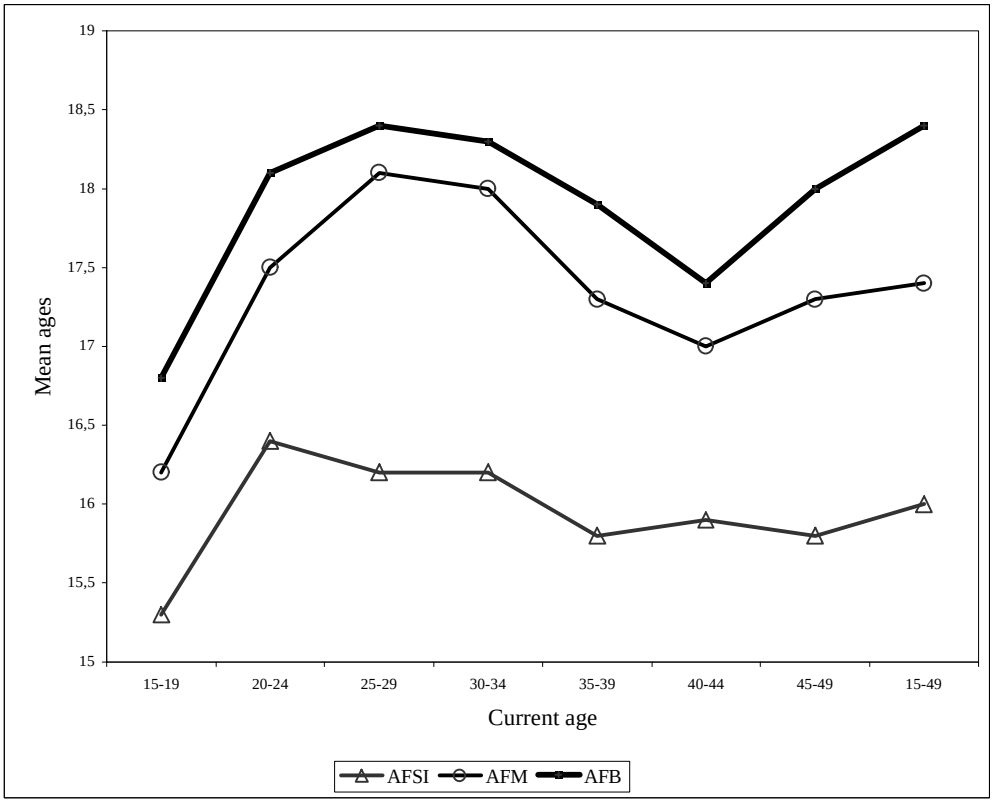
Years prior to the 1996 TDHS	*0*	*5*	*10*	*15*
Age at first birth	Percentage of women			
15-19	23.2	23.8	27.5	34.4
20-24	75.7	75.5	79.5	81.6

Source: calculated from 1996 TDHS

The proportion of women having a first birth at age 15-19 decreases steadily from groups with longer time intervals to those with smaller time intervals between this age and the time of the interview. However, there is a slightly higher proportion of women who have ever given birth in the age group 20-24 at the time of the survey than at the fifth year preceding the survey, which is also an indication of displacement or omission errors.

It is expected that the median age at first birth would either remain stable or increase from the older to the younger age groups, with the expansion in female education over time. The measurement of the time of first births may be affected by errors in the reporting of the date of the birth of the respondent or her oldest child, or by the omission of the first birth, especially for those who died at an early age. These reporting errors might be more prevalent among older women and might lead, in some cases, to an apparent increase of age at first birth. Figure 8 shows that the trimean age at first birth for the age group 45-49 is 0.5 years higher than the trimean for women age 40-44. This is an indication that there was some degree of forward displacement of the date of first birth or an omission of first births of children who died in early infancy among the oldest cohort.

Figure 9: Mean age at first intercourse, first marriage, and first birth by current age



Source: calculated from 1996 TDHS

Figure 9 also show the trimean for age at first sexual intercourse, marriage and birth for successive cohorts of women in the 1996 TDHS. The patterns of these indicators show the same trend of increase in the age group 20-24 and a stability or a slight decrease in older ages. The pattern in age at first birth indicates that there are cases of memory lapse among older women as we expected the pattern to be decreasing as the age increases. However, some of the errors in the dating of the first birth are unavoidable in large-scale retrospective surveys that are conducted in settings where there is poor knowledge and documentation of the dates of events. However, the result of age at first sexual intercourse may be affected by the sensitivity of the question. There is a lot of error in the data concerning this variable. For example, two women aged 16 are recorded as having their sexual experience at age 17, two other women who are currently 17 years are categorised as they had their first sexual intercourse at age 18. One woman in each of the ages 18, 21 and 22 seems to have started sexual intercourse one year ahead of her current age. Either the age was recorded wrongly or they gave false answers regarding this question. Therefore, caution must be exercised in using this data because of errors of recalling, heaping, and displacement.

3.4. Methodology

Most of the characteristics used in the study are duration variables measured in terms of the time elapsed before a particular event is experienced. For example, age at entry into sexual union is recorded as the time elapsed between the date of the birth of an individual woman and the date of the first sexual intercourse. However, for some individuals the time elapsed to the day of the interview may not have been sufficient for the event to occur. In these cases the information on duration has been censored by the interview.

For censored information, classic life table methods and use of current status data are found to be the most suitable analytic methods and will thus be employed for the duration analysis in Chapter 4. To show the distribution of these duration variables, the study will present a series of quartiles T_x i.e. the time elapsed before *x* percent of the persons concerned have experienced the event. The study will present T_{10}, T_{25}, T_{50}, T_{75} and T_{90} as the time elapsed before 10, 25, 50, 75 and 90 percent of the persons have experienced the event.

Trimean (T) as a summary index of birth functions will be calculated. The trimean is a more sensitive measure of location and contains some information about the shape of the distribution (Rodriguez and Hobcraft, 1980). The trimean is the weighted average of the quartiles that give twice as much weight to the median as to the other two quartiles. As a measure of central tendency the trimean, which is defined as $((T_{25} + 2*T_{50} + T_{75})/4)$ will be used.

In this study therefore, the life table technique takes into account the problem of truncation and censoring which can create biases in the estimates. For example since the current age of a person remains the same over a period of 12 months after the person's birthday (complete years), there are women in the sample classified as childless although they still might give birth within the reference age. That means if the survey had been taken at a later point, a number of these previously childless women would have to be classified as mothers.

Selectivity stems from the fact that the transition from, for example marriage to first birth can only be studied for only the ever-married women at the time of the survey.

Censoring results from the fact that at the time of the survey some of the ever-married women who have been selected for analysis have not yet had the first birth but will eventually do so. Ignoring the fact that some of these open intervals will eventually be closed would lead to serious bias. Thus the life table technique allows the study to control censoring biases.

Percentages and measure of central tendencies as well as multiple regression analysis will also be employed in this study. Multiple regression analysis is a multivariate technique which takes care of the fact that the assessment of the possible dependent variable on the independent variable encounters complications arising from influences of other variables, of which all are interrelated. It allows the study to single out the net effect of each independent variable when the impact of the variables is controlled.

The general form of a multiple regression equation is $Y = \alpha + B_1X_1 + B_2X_2 + \ldots + B_nX_n$ where Y is the estimated value of the dependent variable. While α being the constant term, B_I is the regression coefficients for each of the independent variables X_i (for i = 1,2,3,…,n).

3.4.1. ***Bongaarts' Model for Estimating the Proximate Determinants of Fertility***

Due to the fact that in Chapter 5 we will estimate proximate determinants of fertility, it is important to elaborate the methodology used. A framework for analysing the proximate determinants of fertility was developed by Bongaarts (1978) and later elaborated by Bongaarts and Potter (1983). The framework shows that group variation in fertility is due to four main factors: the proportion of married women, practice of contraception, induced abortion, and the period of lactation infecundability. Further, the model (sometimes referred to as Bongaarts' model) has quantified the contribution of these four factors to the observed fertility level.

The general form of the Bongaarts' model is given as follows:

$$TFR = C_m \times C_c \times C_a \times C_i \times TF \qquad (3.1)$$

Where C_m = index of the proportion of married women

C_c = index of contraception

C_a = index of induced abortion

C_i = index of postpartum infecundability

TF = total fecundity rate

TFR = observed total fertility rate

The indices take values between 0 and 1 depending on the magnitude of the fertility-inhibiting effect. The index of marriage equals 1 if all women of reproductive age are married and 0 in the absence of marriage. The index of contraception equals 1 in the absence of contraception and 0 if all fecund women use 100 percent effective contraception. If all pregnancies are interrupted, the index of induced abortion becomes 0 and in the absence of abortions the index is 1. Finally, the index of postpartum infecundability equals 1 in the absence of lactation and postpartum abstinence and 0 if the duration of infecundability is infinite. The total fecundity rate is the maximum number of children a woman can have in her reproductive years in the absence of lactation, abstinence, and contraception, and if she remains married during the entire reproductive period.

The index of the proportion of married women is calculated as the weighted average of the age-specific proportions of married women by using the formula:

$$C_m = \{\Sigma m(a)g(a)\}/\Sigma g(a) \qquad (3.2)$$

where *m(a)* is the proportion of currently married among women aged *a* years. While *g(a)* is the age-specific marital fertility rate. *g(a)* can be computed by dividing the age-specific fertility rate by the proportion of women that is currently married in each age group.

The index of postpartum infecundability is estimated by using the formula:

$$C_i = 20/(18.5+i) \qquad (3.3)$$

where *i* is the average duration of postpartum infecundability caused by breastfeeding or postpartum abstinence. The estimate of *i* is taken as the sum of the postpartum amenorrhea and the portion of postpartum abstinence beyond amenorrhea. The constant 20 in equation (3.3) represents the average birth interval length (in months) if neither breastfeeding nor postpartum abstinence is practised. In the presence of breastfeeding and postpartum abstinence, the average birth interval is estimated to be 18.5 months plus the duration of postpartum infecundability.

The index of contraception is given by the equation:

$$C_c = 1.00 - (1.08 \times u \times e) \qquad (3.4)$$

where *u* is the average proportion of married women currently using contraception and *e* is the average contraceptive effectiveness. The value of *e* is computed using the weighted average of the method-specific use-effectiveness, *e(m)*, by the proportion of women using a given method, *u(m)*.

By using the following formula:

$$e = \{\Sigma e(m)u(m)\} / u \qquad (3.5)$$

where $\Sigma u(m)=u$. Bongaarts and Potter (1983) give the values of *e(m)* used in the computation of *e*. The constant 1.08 given in equation (3.4) is an adjustment for the fact that women or couples do not use contraception if they know or believe that they are sterile (Bongaarts and Potter, 1983).

The index of abortion can be computed by using the formula:

$$C_a = TFR/(TFR + b \times TA) \qquad (3.6)$$

where *TA* is the total abortion rate equal to the average number of induced abortions per woman at the end of the reproductive period if induced abortion rates remain at prevailing levels throughout the reproductive period. *b* is the number of births averted per induced abortion, which may be approximated by the equation:

$$b = 0.4\,(1+u) \qquad (3.7)$$

It has been suggested that in the absence of contraception, an induced abortion averts about 0.4 births, while about 0.8 births are averted when moderately effective contraception is practised (Bongaarts and Potter, 1983). Equation (3.7) yields b=0.4 when u=0, and b=0.8 when u=1.0. Generally, the index of induced abortion can be defined as the ratio of the observed total fertility rate (TFR) to the estimated TFR without induced abortion (TFR + b x TA).

The Bongaarts' model has been very useful in estimating the proximate determinants of fertility. However several factors have been noted to affect the reliability of the estimates from this model. The reporting errors for the variables: current age, age at marriage, duration of breastfeeding, duration of postpartum abstinence, use of contraception and abortion is one of the problems that make the model give biased estimates. Obviously, this problem will not only affect the Bongaarts' model but any model that estimates the proximate determinants of fertility.

The index of the proportion of married women C_m, assumes that all fertility occurs within marriage or consensual union. But a substantial number of non-marital births particularly in Africa can make the value of C_m fail to capture the full 'risk' of exposure to sexuality. In order to circumvent this problem, some analysts have introduced a variable (M_o) which captures the effect on the total fertility of births outside stable unions (Jolly and Gribble, 1993). That is, if $\_m$ captures the effect on total fertility of the observed specific union pattern under the assumption that no births occur outside unions, the product of M_o and $\_m$ gives C_m. It should be noted, however, that M_o is not a fertility-reducing parameter of the model but a correction factor for $\_m$.

Another factor which usually causes a problem in applying Bongaarts' model (at least in Africa) is the failure to incorporate the incidence of induced abortion. Although the assumption that abortion is insignificant is valid in some countries, in others this assumption can create serious bias in the estimation of the model. In many African countries, induced abortion is permitted only to save a mother's life. So people practise illegal induced abortion, of which data cannot easily be collected, to terminate unwanted

pregnancies. The extent of the problem used to be minimal, but as Justesen et al. (1992) shows, the number of induced abortions is growing very fast particularly among young and unmarried women residing in urban areas.

It has been argued that Bongaarts' model produces very good estimates under the assumption of random use of contraception and induced abortion. Reinis (1992) finds that with non-random use of contraception, which is more likely, given that women tend to use contraception depending on their family-building plans, the estimates produced (except for C_i) are less accurate. For instance, if the use of contraception is concentrated at the later ages, C_c is a poor estimator of the fertility-reducing impact of contraception because women who have become sterile dominate use. Reinis (1992) has concluded that the Bongaarts' model performs poorly when women use contraception to stop rather than to space births, when there is delayed marriage, and when contraceptive use is most prevalent at the oldest ages. These problems, however, seem to be minimal in a country like Tanzania where women use contraception at all ages and mainly for spacing purposes.

3.4.2. Logistic Regression

Logistic regression, also called logit regression is used when the response variable may be quantitative, categorical, or a mixture of the two.

In a study of determinants of contraceptive use, for example, the response variable may be use or non-use of contraception at the time of the survey. In a situation like this, the standard multiple regression analysis becomes inappropriate as the response and predictors cannot be related through a linear relationship. One important method that can be used in such a situation is logistic regression. Logistic regression has been widely used in a functional relationship where the response variable is categorical, often either a success or failure.

Suppose that y_i is a binomial random variable, with n_i trials, and with a probability of success on any trial equal to π_i (with $0 \leq \pi_i \leq 1$ unknown). In logistic regression, we model π_i as a functional form relating π_i to X_i known to be S-shaped (Weisberg, 1985). This can be done by using the logit transformation of π_i, defined to be

logit ($_i$) = ln[$_i$/(1- $_i$)] (3.8)

The logit is the logarithm of the odds of success, the ratio of the probability of success to the probability of failure. The properties of the logit function include:

- as $_i$ increases, so does logit ($_i$), and
- logit ($_i$) varies over the whole real line, whereas $_i$ is bounded between 0 and 1.

The logistic regression model can then be expressed in two equivalent ways. First, we can fit a linear model in the logit scale,

logit ($_i$) = $ß_0 + ß_1X_i$ (3.9)

solving (3.9)for i, using (3.8), we get the form

(y_i/n_i) = $_i$ = exp($ß_0 + ß_1X_i$) / 1 + exp($ß_0 + ß_1X_i$) (3.10)

Equation (3.10) expresses the model as an S-shaped curve in the original probability scale. It can be noted also that equation (3.9) and (3.10) are equivalent.

In logistic regression, the deviance is useful in some goodness of fit tests, and changes in deviance between various models are used in significance testing. The deviance is defined as

$$deviance = 2x\sum y_i \ln\left(\frac{y_i}{n_i q_i}\right) + (n_i - y_i)\ln\left(\frac{n_i - y_i}{n_i - n_i q_i}\right) \quad (3.11)$$

with *N*- degrees of freedom, where is the number of ß in the linear form and *N* is number of binomials. To compare two nested models, compute the changes in deviance and degree of freedom, compare the results with the p-value of the chi-square distribution.

3.4.3. Multiple Classification Analysis (MCA) Predictions

Retherford and Choe (1993) have shown that the most convenient way to present the effects of the predictor variables on the response variable in multinomial logit

regression is in the form of a Multiple Classification Analysis (MCA) table. This section reproduces (from Retherford and Choe, 1993) the procedure used to construct an MCA table by using an example of a response variable with three categories and two predictor variables.

Suppose that the response variable is unmet need for family planning:

P_1 = estimated probability of having unmet need for spacing births

P_2 = estimated probability of having unmet need for limiting births

P_3 = estimated probability of having a met need (that is, no unmet need).

Suppose also that the predictor variables are education (low, medium and high) and ethnicity (Indian and Fiji):

M: 1 if medium education, 0 otherwise

H: 1 if high education, 0 otherwise

I: 1 if Indian, 0 otherwise

The interest is to examine how education and ethnicity influence unmet need for family planning. The multinomial logit model then consists of two equations plus a constraint:

$$\log (P_1/P_3) = a_1 + b_1M + c_1H + d_1I \quad (3.12)$$

$$\log (P_2/P_3) = a_2 + b_2M + c_2H + d_2I \quad (3.13)$$

$$P_1 + P_2 + P_3 = 1 \quad (3.14)$$

where a_1, b_1, c_1, d_1, a_2, b_2, c_2, and d_2 are coefficients.

Equations (3.12) and (3.13) can be written as

$$P_1 = P_3 \exp(a_1 + b_1M + c_1H + d_1I) \quad (3.15)$$

$$P_2 = P_3 \exp(a_2 + b_2M + c_2H + d_2I) \quad (3.16)$$

Also, we have the identity

$$P_3 = P_3 \quad (3.17)$$

Recall that $P_1 + P_2 + P_3 = 1$, we get

$$1 = P_3 \Sigma\{\exp(a_j + b_jM + c_jH + d_jI) + P_3 \quad (3.18)$$

Solving (3.18) for P_3, we obtain

$$P_3 = 1 / 1 + \Sigma\{\exp(a_j + b_jM + c_jH + d_jI)\} \quad (3.19)$$

Substituting (3.19) into (3.15) and (3.16) and repeating (3.17), we obtain

$$P_1 = \exp(a_1 + b_1M + c_1H + d_1I)/1 + \Sigma\{\exp(a_j + b_jM + c_jH + d_jI)\} \quad (3.20)$$

$$P_2 = \exp(a_2 + b_2M + c_2H + d_2I)/1 + \Sigma\{\exp(a_j + b_jM + c_jH + d_jI)\} \quad (3.21)$$

$$P_3 = 1/1 + \Sigma\{\exp(a_j + b_jM + c_jH + d_jI)\} \quad (3.22)$$

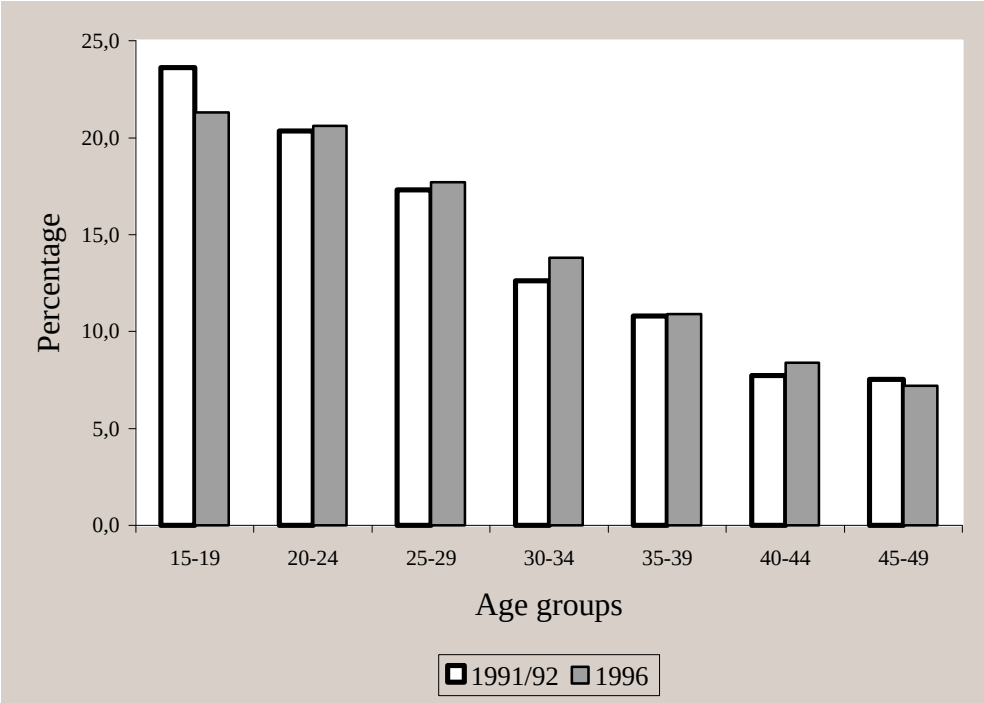
where the summations range from j=1 to j=2.

Equation (3.20), (3.21), and (3.22) are calculation formulae for P_1, P_2, and P_3 respectively. A shortcut for calculating P_3 is to calculate P_1 and P_2 from (3.20) and (3.21) and then obtain P_3 as $1-(P_1+P_2)$. The MCA tables are constructed by substituting appropriate combinations of ones, zeros, and mean values in equation (3.20), (3.21), and (3.22). For example, the formulae for P_1, P_2, and P_3 for those with high education are obtained by substituting M=0, H=1 and I=1 in (3.20), (3.21), and (3.22). The formulae for P_1, P_2, and P_3 are obtained by substituting I=0, M=M, and H=H in (3.20), (3.21), and (3.22).

3.5. Background Characteristics of the Respondents for 1991/92 and 1996 TDHS

The knowledge of the socio-economic characteristics of the respondents facilitates the interpretation of the findings in this study. Figure 10 presents the distribution of respondents by current age in two TDHSs.

Figure 10: Percentage distribution of respondents by current age



Source: calculated from 1991/92 and 1996 TDHSs

From Figure 10 it is clear that in both surveys more than half of the interviewed population is under age 30. The respondents in this category (age 15-30) are around 60 percent of the total sampled population. With a distribution of 23.6 and 21.3 percent for 1991/92 and 1996 respectively, the 15-19 age group has the highest representation in the sampled population for all the surveys. But in this age group the dominant age was 16 years as Figure 5 shows. The reason for this domination was due to the fact that most of the women at age 15 might be underrepresented because the interviewers tried to avoid to include them in the sample in order to minimise workload. This sort of distribution reflects the youthful age structure of Tanzania's population. It is well known that most of child bearing occurs between ages 15 and 34, therefore this youthful population has implications on fertility. Figure 10 also shows that 73.5 percent of the respondents are in this category, further evidence of the high representation of reproductive potentials in the TDHSs. The age group 45-49 had the lowest proportion of respondents. This will affect the results of sterility as the estimation of infertility involves women who have reached their menopause. Therefore this study will have to use indirect measure of infertility.

Table 6: Percentage Distribution of respondents by background characteristics

Characteristics	*1991/92*	*1996*
Place of residence:		
Urban	19.9	23.5
Rural	80.1	76.5
Education:		
No education	33.9	28.7
Incomplete primary	19.8	19.9
Complete primary	41.6	45.4
Secondary +	4.8	6.0
Religion:		
Moslem	30.7	31.2
Catholic	30.1	31.4
Protestant	25.0	25.5
Other	14.2	11.8
Marital Status:		
Never married	24.5	23.2
Married	65.4	66.7
Widowed	2.9	3.1
Divorced	7.3	7.0

Source: calculated from 1996 TDHS

As reflected in Table 6, the majority of the respondents were found to be living in rural areas, while less than a quarter of the respondents came from urban areas. It was found in the 1988 Population Census that more than 80 percent of the population reside in rural areas, hence the TDHS surveys match well with that census result. The table further shows a recent rapid increase in the proportion of Tanzanian women living in urban areas as the proportion of female respondents residing in urban areas increased from 20 percent in 1992 to 24 percent in 1996. There has also been a slight increase in the education of women between 1992 and 1996. While 46 percent of women 15-49 at the time of the 1991/92 TDHS reported that they had completed primary school or higher, it was found that 51 percent in the 1996 TDHS had completed primary education and above. The distribution of women by marital status is similar in both TDHSs.

Table 6 reveals that more than one quarter of the women in the 1996 TDHS sample (28.7 percent) has never attended school. Only 6 percent have secondary education and above. It is therefore evident that out of the women who enrol in primary school, a good number have completed seven years of schooling but most of them could not reach secondary school. Data from Trends in Demographic Family Planning, and Health Indicators in Tanzania of the Bureau of Statistics (1997) also show that there has been a

declining trend in the proportion of women (7 years and above) with no education from 46.1 percent in the 1991/92 TDHS to 41.7 percent in the 1996 TDHS.

The women interviewed in the survey were classified into four categories by religion as shown in Table 6, including those who responded as none believers and traditional believers. The TDHS data suggest that the majority of Tanzanian women (56.9 percent) are Christians with the highest proportion comprising Catholics who represent 31.4 percent of the sampled population. The 'others' form the lowest group of all: less than 12 percent.

Table 7: Percentage distribution of women by current marital status and current age

Age group	*Never married*	*Married*	*Widowed*	*Divorced*	*Not living together*	*N*
15-19	74.6	23.2	0.1	1.2	0.9	1,732
20-24	24.5	67.5	1.2	4.5	2.3	1,676
25-29	7.4	82.2	1.5	6.5	2.5	1,440
30-34	4.5	84.7	3.5	4.8	2.4	1,118
35-39	1.7	83.3	5.3	8.0	1.7	888
40-44	1.5	82.5	8.1	5.6	2.4	680
45-49	0.7	76.5	11.1	7.5	4.1	584
15-49	**23.2**	**66.7**	**3.1**	**4.9**	**2.1**	**8,119**

Source: calculated from 1996 TDHS

In this study, the terms 'living together with a male partner' and 'married' are combined and referred to as 'currently married'. Women who are currently married, widowed, divorced or not living together are referred to as 'ever married'. Table 6 shows that only 23.2 percent of women of child bearing age have never been married. This proportion of the never married women falls sharply from 74.6 percent in the age group 15-19 to 7.4 percent in the age group 25-29. It then declines to 0.7 percent in the age group 45-49, reinforcing earlier findings that most women in Tanzania marry early. At the age of 25 more than 90 percent have been married (Table 7). It is also evident that a large proportion of women (66.7 percent) are currently married and only a small proportion (10.1 percent) are either widowed, divorced or are not living together with male partners. The proportion of women who are currently divorced and not re-married is small (4.9 percent) indicating that in general marital unions in Tanzania seem to be stable. However, there is no consistency in the pattern of marital stability across the

cohorts. The striking point is the percentage of divorces in the age group 15-19 (1.2 percent). We do not expect to find divorcees at this tender age. Widowhood increases steadily with age, varying from an insignificant proportion of 1.2 percent for women aged 15-19 years and reaching a maximum at 26.4 percent for those aged 45-49.

Table 8: Percentage distribution of adolescent women by current marital status

Age	*Never married*	*Currently married*	*Widowed*	*Divorced*	*Not living together*	*N*
15	78.8	3.8	0.0	0.3	0.0	288
16	88.5	11.0	0.0	0.5	0.0	408
17	80.2	18.7	0.0	1.2	0.0	343
18	65.0	33.3	0.0	1.1	2.0	354
19	44.5	48.7	0.6	3.3	2.7	335

Source: calculated from 1996 TDHS

As noticed in Table 8, the same situation prevails with the adolescents, as the proportion of the never married adolescent women decreases with age. The proportion of the currently married increases with age, while we find widowed adolescent women already at age 19. But divorce starts as early as age 15, with 0.3 percent, and increases with age to 3.3 percent by age 19. Women who agreed to have partners but are not living together with them are found from age 18 onwards. However, these women who admitted to have partnership although not living with them under the same roof may be equated with 'nyumba ndogo'.[12]

[12] Nyumba ndogo means concubine whereby a married man secretly keeps a household with another woman. This is also a type of polygamous behaviour but in a different way. With nyumba ndogo, the 'official' wife does not have any knowledge of the informal wife. Usually the informal wife is younger than the formal wife.

4. Age at First Birth

4.1. Introduction

This chapter will examine levels and the proximate determinants of age at first birth as well as socio-economic variables or independent variables that operate through proximate determinants to influence age at first birth in Tanzania. Lastly the extent to which age at first birth influences fertility in Tanzania will be examined.

The onset of child bearing is an important demographic indicator as seen in the introductory chapter. However, postponement of first births as a result of a higher age at marriage would play an important role in the overall fertility decline of any country provided that age at first marriage is synonymous with age of entry into sexual relations. Women's age at first birth vary considerably among developing countries and regions of the world. For example, among the 41 countries that participated in the World Fertility Survey (WFS), women's average age at first birth ranged from about 17 years in Bangladesh to more than 25 years in Korea and Sri Lanka (Pebley, 1981). The study further found that age at first birth has remained relatively stable for almost 30 years according to cohort analysis in most of the countries that participated in the survey, although there are exceptions.

One of these exceptions is South Korea where the mean age at first birth was found to have risen from 20.7 to 27.1 in 30 years. The key factor for this rise was associated with an increase in the age at marriage, which rose from 17.8 in 1940 to 23.3 in 1970. The increasing age at marriage was due to an expansion of university education for men and women as well as a rapid economic growth.

In a recent comparative study of 37 countries, which participated in DHS from 1986 to 1992, Westoff et al. (1994) found that in sub-Saharan Africa the median age at first birth for women aged 25 to 49 ranged from 18.1 years in Niger to 21.5 years in Rwanda. In the majority of countries, it is below age 20.

Child bearing at an early age entails substantial health risks for both the mother and the child. Complications of pregnancy at an early age include first and third trimester bleeding, severe anemia, preeclampsia and toxemia, prolonged or obstructed labour, cephalopelvic disproportion, prematurity, low birth weight, stillbirth, high prenatal and infant mortality, and high maternal mortality (Casterline and Trussell, 1980; Cherlin and Riley, 1986; Lowe, 1977). Furthermore, early motherhood tends to impede the pursuit of other life options that might compete with child bearing (Gyepi-Garbrah, 1985c). Due to the fact that adolescent child bearing hinders a mother's educational attainment, it often results in reducing economic opportunity for the mother and the household as a whole (Rao and Balakrishnan, 1988).

4.2. Age at first birth in Tanzania

The 1996 TDHS[13] data indicate that Tanzanian women have a low age at first birth. More than half of the interviewed population of women (50.8 percent) become mothers before they reach age 20, with a high proportion of them reporting their first birth between ages 15 and 17 (Table 9). In a comparative study of DHS data, Westoff et al. (1994) found a non-uniformity of the proportion of women having birth by age 20 among sub-Saharan countries. For example the study found that between age 20 to 24 the percentage ranges from 25 in Rwanda to 75 percent in Niger. In the 1996 TDHS the percentage was 52.3 among women age 20-24 which can be considered consistent with other sub-Saharan countries.

[13] Unless specified TDHS in this study means the 1996 TDHS.

Table 9: Percentage distribution of women by age at first birth according to current age in Tanzania

Current age	*Never*	*Ever*	*N*	*Had given birth*						
				<15	*15-17*	*18-19*	*20-21*	*22-24*	*25+*	*N*
15-19	79.2	20.8	1,732	5.3	59.6	35.6				360
20-24	25.6	74.4	1,676	4.3	29.7	36.3	23.4	6.3		1,247
25-29	8.2	91.8	1,440	4.6	26.3	32.8	20.7	11.9	3.8	1,322
30-34	3.8	96.2	1,117	7.1	28.4	26.0	17.7	14.4	6.5	1,075
35-39	3.7	96.3	888	8.5	32.8	23.5	16.6	11.1	7.4	855
40-44	1.8	98.2	679	10.5	34.0	25.4	13.7	9.3	7.2	667
45-49	1.9	98.1	585	11.8	28.0	22.8	12.7	13.5	11.3	574
15-49	**24.8**	**75.2**	**8,117**	**6.9**	**31.3**	**29.4**	**17.4**	**10.2**	**4.8**	**6,104**

Source: calculated from 1996 TDHS

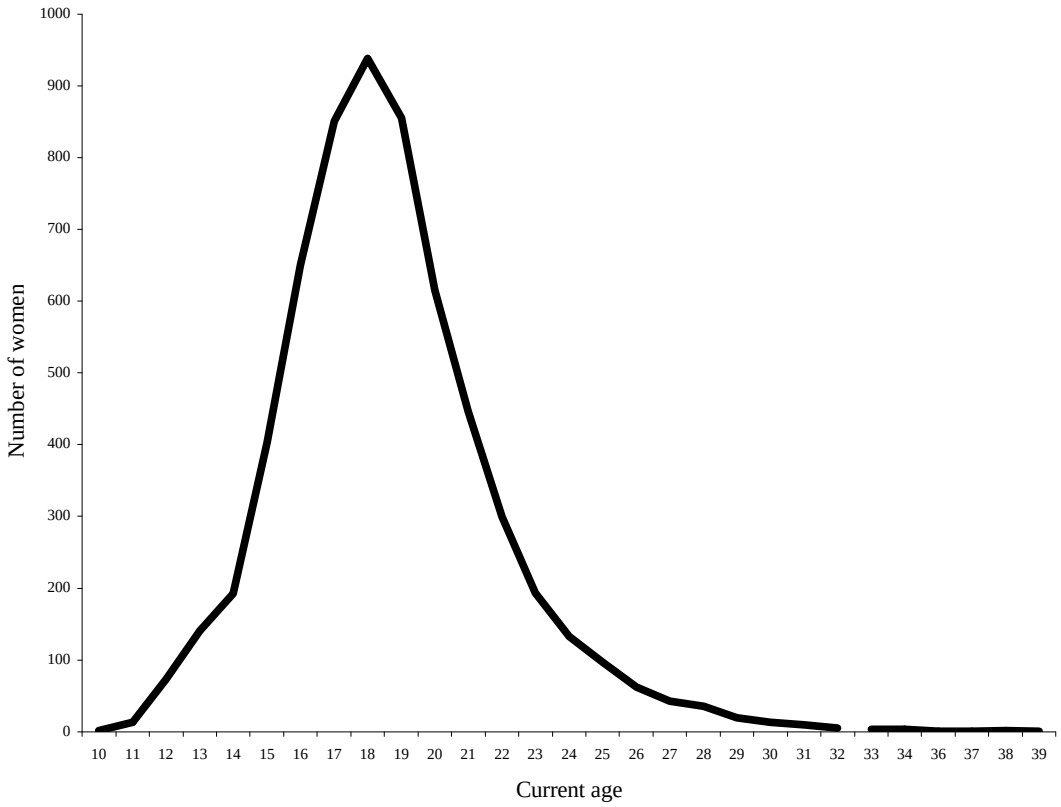
Table 9 shows that almost 7 percent of the women reported having had their first birth before they were 15 years of age, with a few cases reporting ages as low as 10 years (Figure 11). This finding has serious health implications since young mothers suffer more from health problems associated with pregnancy and childbirth than older women as explained above. This situation might also render such mothers infertile in the future or worse still lead to death. Fortunately, the percentage of women who became mothers before age 15 has declined in the past 30 years by more than 50 percent from 11.8 (45-49) to 4.6 (25-29) percent. But surprising enough, the number of women giving birth over age 24 has decreased dramatically in the same period from 11.3 percent to 3.8 percent. The same trend has been observed in the 1991/92 TDHS (see Table 10).

Table 10: Percentage distribution of women, who ever gave birth, by age at first birth according to current age, 1991/92 TDHS

Current age	*<15*	*15-17*	*18-19*	*20-21*	*22-24*	*25+*	*N*
15-19	3.9	59.8	36.3				507
20-24	5.3	32.1	37.7	19.4	5.5		1,424
25-29	6.0	27.9	26.4	20.5	13.4	5.8	1,497
30-34	9.6	37.1	21.8	15.2	10.9	5.4	1,115
35-39	8.4	37.6	22.4	13.9	10.3	7.4	980
40-44	10.1	35.4	21.7	14.0	11.2	7.6	695
45-49	10.2	32.7	19.9	15.1	10.8	11.2	667
15-49	**7.5**	**35.2**	**27.1**	**15.8**	**9.5**	**5.1**	**6,885**

Source: calculated from 1996 TDHS

Figure 11: Frequency distribution of age at first birth in single years



Source: calculated from 1996 TDHS

According to figure 4.1, which shows the frequency distribution of age at first birth in single years, it is evident that the majority of women in Tanzania start child bearing at an early age. Most of these first births are concentrated between ages 16 and 19 with only a few first births (3.6 percent) occurring after age 25. The figure reveals that child bearing starts as early as age 10 and as late as age 39. However, only few cases are found at these two extremes. These measures are crude, and possibly lead to false estimates due to the fact that age at first birth is the duration between the mother's birth and the birth of her first offspring, therefore the process might be incomplete at the time of the survey. This factor and others as explained in Chapter 3, make the use of life table a necessity in this study. Age group 15-19 will not be discussed here as Chapter 7 is about adolescents in particular due to the fact that adolescents have different characteristics and consequences in comparison to adults.

Table 11 shows the adjusted mean age at first birth to be 18.4 years. It is possible that the mean could have been lower if it were not for the fact that a few women reported

having had their first birth at ages as late as 39 years. The table further shows that there has been an increasing trend in mean age at first birth among Tanzanian women. For example, women currently aged 25-29 have a mean age at first birth of 18.4 years whereas women aged 40-44 have a mean age of only 17.4 years. With modernisation, more women now go to school and stay in the education system longer than in the past. More years in school means postponing first birth. Few of the older women attended school and those who did, never stayed for many years in the education system. Marriage used to be at an early age, and child bearing started almost immediately afterwards, as many of them were not engaged in any wage employment.

Table 11: Mean age at first birth by current age

Age group	*T10*	*T25*	*T50*	*T75*	*Trimean*	*Spread*	*N*
15-19	14.8	15.8	16.9	17.9	16.8	1.4	360
20-24	15.3	16.8	17.8	19.8	18.1	2.2	1,247
25-29	15.4	17.0	18.0	20.5	18.4	2.8	1,322
30-34	14.7	16.5	17.8	20.8	18.3	3.5	1,075
35-39	14.4	16.2	17.4	20.6	17.9	3.7	855
40-44	13.9	15.8	17.0	20.0	17.4	3.8	667
45-49	14.0	16.0	17.4	21.2	18.0	4.4	574
15-49	**15.0**	**16.5**	**18.3**	**20.3**	**18.4**	**3.3**	**6,104**

Source: calculated from 1996 TDHS

The trimean for women in age group 45-49 is higher than expected, namely at 18.0 years. It is possible that women in this group reported the age of their first birth inaccurately. This might have caused the inflation in their mean age at first birth. In general, by the age of 15 years (Table 11), 10 percent of women in Tanzania have had their first live birth. About a quarter of those, who ever gave birth to a child, have done so by the time they were 16.5 years old. At 18 years of age, only 10 percent have never experienced a live birth. The spread of 3.3 means that most women in Tanzania have their age at first births around the mean that is about three and a quarter year below or above 18.3 years. According to this spread, most Tanzanian women have their first birth between 15 and 21.6 years of age. The spread of 3.3 indicates a high fertility for a country with broad bottom age structure. In general, there seem to be marginal differences in the mean age at first birth between older women, who had their first child many years ago and younger women who had their first birth recently.

Let us now examine the proportions of ever giving birth according to current age so as to have a better understanding of age at first birth in Tanzania. Table 12 below shows the proportions of women, who ever gave birth.

Table 12: Proportions of women, who ever gave birth, by current age

Current age	*Never*	*Ever*	*N*
15-19	0.79	0.21	1,732
20-24	0.26	0.74	1,676
25-29	0.08	0.92	1,440
30-34	0.04	0.96	1,117
35-39	0.04	0.96	888
40-44	0.02	0.98	679
45-49	0.02	0.98	585
15-49	**0.25**	**0.75**	**8,117**

Source: calculated from 1996 TDHS

According to Table 12, 75 percent of the women had given birth to at least one child at the time of the survey. The remaining 25 percent reported that they never have given birth. The proportion ever giving birth increases with age across the cohorts from 20 percent in age group 15-19 to 96 percent in age group 30-34 until it reaches the maximum of 98 percent in the age group 45-49.

Although women in age group 45-49 have had the longest exposure to the risk of childbirth, the proportion ever giving birth is not 1.0 as expected. This might be a result of the prevalence of infertility and sterility owing to poorer nutrition and a lack of good medical care during their prime reproductive ages. For example, a woman could have primary sterility due to a venereal disease but because of ignorance and inadequate medical care, she might become barren. With modernisation and women's education increases, this might not occur to the same extent anymore. Also owing to better nutrition, hygiene and medical care, sub-fecund women nowadays have chances of giving birth.

Table 13: Logistic regression odds ratio predicting the relative risk that a woman had a live birth before age 15

Variable	*Odds ratio*
Literacy	
Literate	.31***
Semiliterate	.76*
Illiterate	RC
Religion	
Moslems	RC
Catholics	.76**
Protestants	.73**
Others	.72*
Place of Residence	
Urban	1.17
Rural	RC
Age	
15-19	1.47**
20+	RC

*** p<.001 (highly significant)
** p<.01 (significant)
* p<.05 (less significant)
p>.05 (insignificant)
Source: calculated from 1996 TDHS

Table 13 shows results of a logistic regression model estimating the effect of background variables on the likelihood that a woman had a live birth before attaining age 15. It seems that education is negatively related to child bearing at early ages. Literate women seem to be 3 times less likely to give birth before age 15 than illiterate women. Moslems are more likely to give birth before age 15 than other religious denominations. Other religious believers who are not Moslems are almost 1.3 less likely to have given birth before attaining age 15 than Moslem women, and adolescents are 1.5 times more likely to give birth before age 15 than adult women were at that age.

Table 14: Mean age at first birth by current age in sub-Saharan Africa and selected developing countries

Country	*Year*	*T10*	*T25*	*T50*	*T75*	*Trimean*	*Spread*	*N*
Benin	1996	15.3	16.8	18.7	20.8	18.8	3.3	4,201
Central African Republic	1994	14.1	16.0	17.9	20.4	18.1	3.8	4,737
Comores	1996	14.7	16.5	19.1	22.1	19.2	4.4	1,695
Côte d'Ivoire	1994	14.1	15.7	17.6	19.9	17.6	3.5	6,147
Ghana	1993	15.5	17.1	19.0	21.4	19.1	3.5	3,505
Kenya	1993	14.8	16.4	18.2	20.3	18.3	3.3	5,437
Mali	1995	14.7	16.0	17.7	20.0	17.9	3.4	7,980
Tanzania	**1996**	**15.0**	**16.5**	**18.3**	**20.3**	**18.4**	**3.3**	**33,702**
Uganda	1995	14.3	15.8	17.6	19.7	17.7	3.2	5,594
Zambia	1996	14.9	16.2	17.8	19.6	17.9	3.0	5,939
Zimbabwe	1994	15.2	16.8	18.7	20.7	18.7	3.3	4,330
Egypt	1995	15.4	17.3	19.8	22.9	20.0	4.2	13,390
Bangladesh	1996	14.0	15.1	16.7	18.8	16.8	2.9	8,543
Brazil	1996	16.2	17.9	20.4	23.5	20.6	4.4	8,405
Dominican Republic	1996	15.2	17.0	19.3	22.4	19.5	4.3	5,768

Source: calculated from DHS III

The mean age at first birth in sub-Saharan Africa ranges from 17.7 years for Uganda to 19.2 in Comores. Egypt, Brazil and the Dominican Republic which have a higher age at first birth (20, 20.6 and 19.5 years) than the selected countries in sub-Saharan Africa which conducted DHS III so far. The spread of more than 4 years can be associated with higher mean age at first birth. Countries (Table 15) that have a spread of more than 4 years have higher mean age at first birth. In sub-Saharan Africa, 10 percent of women got their first child between age 14 and 15 while for Brazil the same percentage is reached by the age of 16.2. Hence in all selected countries, women start their child bearing during adolescence but the main difference is the beginning of child bearing. Tanzania is not an exception. The early age at birth found to prevail among sub-Saharan countries is consistent with the findings of previous studies which have reported unusually early age at child births, which is direct associated with high levels of adolescent fertility prevailing in sub-Saharan Africa (Gyepi-Garbrah, 1985c).

Table 15: Trends in age at first child bearing in sub-Saharan Africa and selected developing countries

Ages	Be-nin	CAR*	Côte d' Ivoire	Ghana	Kenya	Mali	Ugan-da	Zam-bia	Zim-babwe	Tanza-nia	Egypt	Bang-ladesh	Brazil	DR**
15-19	17.0	16.2	15.9	17.1	16.7	16.2	16.3	16.6	16.8	16.9	16.9	15.7	16.2	16.2
20-24	18.5	17.6	17.1	18.3	18.1	17.3	17.7	17.8	18.4	17.8	18.7	16.9	18.6	18.1
25-29	18.9	18.3	17.8	19.3	18.6	17.9	18.1	18.2	18.9	18.0	20.1	17.1	19.8	19.3
30-34	18.8	18.5	18.1	19.3	18.4	17.9	17.8	18.0	18.7	17.8	20.3	17.0	20.9	20.0
35-39	19.3	18.8	18.3	19.8	18.3	18.5	17.8	17.7	18.9	17.4	20.4	16.7	21.3	19.7
40-44	18.9	18.0	18.5	19.3	18.4	18.4	17.9	17.9	19.2	17.0	20.7	16.4	21.4	19.4
45-49	18.8	18.7	18.6	19.6	18.7	18.5	17.8	17.7	19.0	17.4	19.6	16.7	21.9	19.7

* Central African Republic; ** Dominican Republic

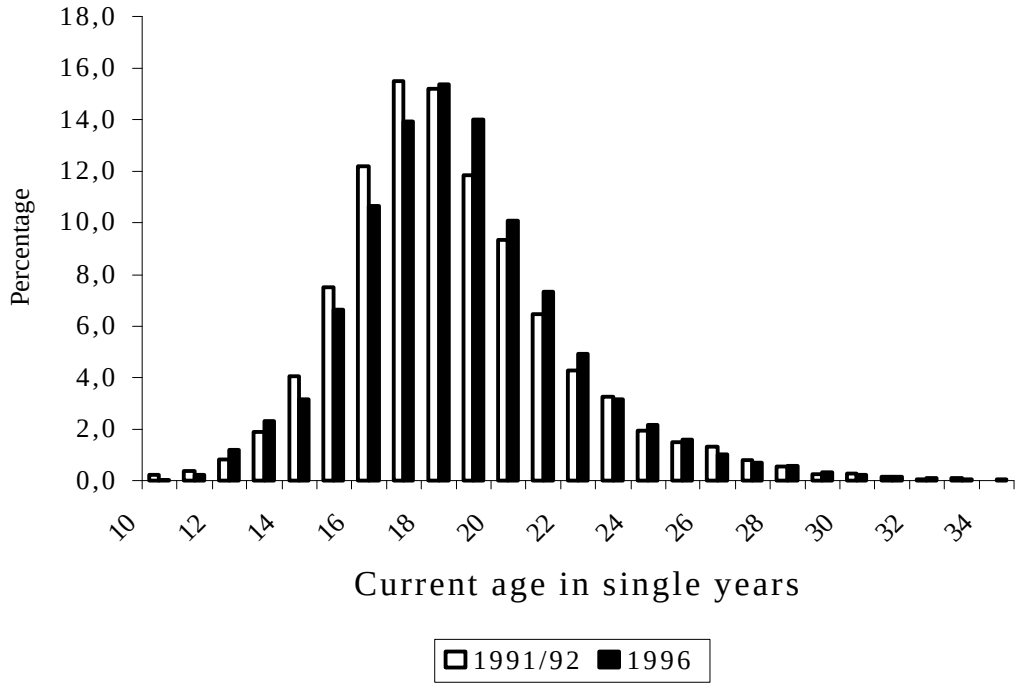
Source: calculated from DHS III

In Tanzania, Kenya, Ghana, Côte d'Ivoire and the Central African Republic the mean age at first birth for women 40-44 is lower than the mean for those 45-49. This was also observed in the DHS Comparative Studies (Westoff, et al 1994). This does not necessarily indicate a trend towards lower age at first birth, but more probably indicates a bias caused by recall error. Older women appear to displace the exact timing of this event to older ages. For this reason as well as the possibility that other types of reporting errors occur, caution is warranted in the interpretation of differences across age cohorts.

Thus in examining trends over time, it is preferable to use the age group 40-44 as the starting point of the trend line. The mean age at first birth for women 40-44 ranges from 17.0 years in Tanzania to 19.3 years in Ghana. Likewise for age group 25-29 it ranges from 17.8 in Côte d'Ivoire to 19.3 years in Ghana. Trends over the time in the age at first birth can be seen by examining the differences in the mean age at birth between the cohort of women 40-44 and the cohort 25-29. The choice of these age groups is in line with earlier findings that most of child bearing in sub-Saharan countries is within adolescence.

Table 15 suggests that age at first birth has been generally at the same level for most sub-Saharan counties for the past 15 years (by examining age groups 40-44 to 25-29). Tanzania, Zambia, Uganda and Kenya show slightly increasing trends in age at first birth. Ghana and Benin show that there has been no increase or decrease in mean age at first birth. Other countries show a decline in the age at first birth in 15 years prior to the surveys in the sub-Saharan region. However, it is likely that in most cases the decline is due to reporting errors.

Figure 12: Trend in age at first birth in Tanzania 1991/92-1996



Source: calculated from 1991/92 and 1996 TDHSs

Figure 12 suggests a slight shift from an early age at first birth towards a slightly later age at first birth in Tanzania. This supports the earlier findings. All in all, we do not expect any meaningful trend by using the 1991/92 TDHS and 1996 TDHS, due to the fact that the period between these two is just four years.

4.3. Proximate Determinants of Age at First Birth

The major fertility variables that are of great importance in starting the patterns of family formation are the proportion remaining childless and the age at first birth for those who bear children. Since marriage is believed to be virtually universal in Tanzania and voluntary childlessness is unknown, the main proximate determinants of proportion remaining childless is the incidence of primary sterility. On the other hand, the proximate determinant of age at first birth includes:

- age at menarche,
- age at first sexual intercourse,

- age at first marriage,
- the incidence of primary sterility,
- practice of contraception in order to delay first conception,
- and induced abortion and early pregnancy wastage prior to first birth.

4.3.1. Age at menarche

One of the necessary conditions for conception to take place is that the woman must have already started ovulating. Since it is difficult for a woman to know if her body has started to ovulate, except by the use of very complicated clinical tests, the occurrence can be approximated by menarche (the onset of menstrual periods). Menstruation, being a very noticeable process, lends itself as a useful survey tool for the estimation of the start of ovulation even though sometimes it precedes ovulation by several months.

Several studies have established that first marriage occurs earlier among women with early menarche (Buck and Stavraky, 1967; Kiernan, 1977; Ryder and Westoff, 1971). Other studies by Presser (1978), Zelnik (1981), and Udry (1979) have shown that women with early menarche have early first intercourse and earlier first births. The mechanisms for linking events in timing and sequence are not clearly understood. Various mechanisms have been proposed. Biological mechanisms include increased release of sex hormones at puberty leading to increased libido, and consequently too early intercourse. Those women with early puberty are more fecund than women with later puberty. This fact leads to earlier births for a given exposure to the risk of pregnancy for those women with early age at menarche.

The social processes in conjunction with pubertal hormones that lead to early development of secondary sexual characteristics, which are attractive to males, provide early opportunities for intercourse. Parents and peers provide encouragement for early intercourse or marriage to the woman with early menarche, as parents want to see their daughters married. This is due to the fact that parents would not like their daughters to have out of wedlock pregnancies, and also they would like to get their bride price as early as possible. Moreover parents are happy when their daughters are married as it signifies their maturity.

Mpiti and Kalule-Sabiti (1985a) in analysing data from a Lesotho Fertility Survey found that 10 percent of the interviewed women started having menstrual periods by the age of 13 years and that the mean age at menarche was 15 years. In analysing the distributions of the onset of menstruation for cohorts of women, they found that younger cohorts experienced the onset at earlier age. Gyepi-Garbrah (1985c) found a drop of age at puberty to approximately 12-14 in most areas of sub-Saharan Africa by using Fertility and Survey data. For this fact, we can conclude that the age at menarche is declining in this region of the world although a rapid decline might not be typical of subgroups with less than adequate nutrition (Muroki, 1988).

Age at menarche, though an important proximate determinant of age at first birth as it signifies the beginning of puberty, will not be analysed in this study, as the TDHS data does not provide any information on it. Further research must be on this proximate determinant of age at first birth.

4.3.2. Age at First Sexual Intercourse[14]

Even with the onset of puberty, child bearing cannot take place unless one engages in sexual activities that eventually lead to pregnancy. Information on the timing of first marriage, first intercourse, and first birth is crucial for the onset of the child bearing years. The conventional marker of the beginning of exposure to the risk of pregnancy is the date of first union. However, in some societies, sexual activity is not confined to marriage and women may bear children before the recognition of the date of first union. In such settings, the age at first sexual intercourse and date of first birth may be more appropriate indicators of the beginning of sexual exposure than the date of first union. The same is true in settings where marriages are arranged in early childhood and months or even years may elapse before the marriage is consummated. Age at first sexual

[14] In fact, many ethnicities in Tanzania have different standards for men and for women, i.e. tolerating or sometimes even encouraging sexual activity among unmarried men, while restricting and harshly condemning it among unmarried women. In that way, women may be unlikely to acknowledge such behaviour. Therefore, the survey data assessing sexual activity are expected to underestimate the actual levels.

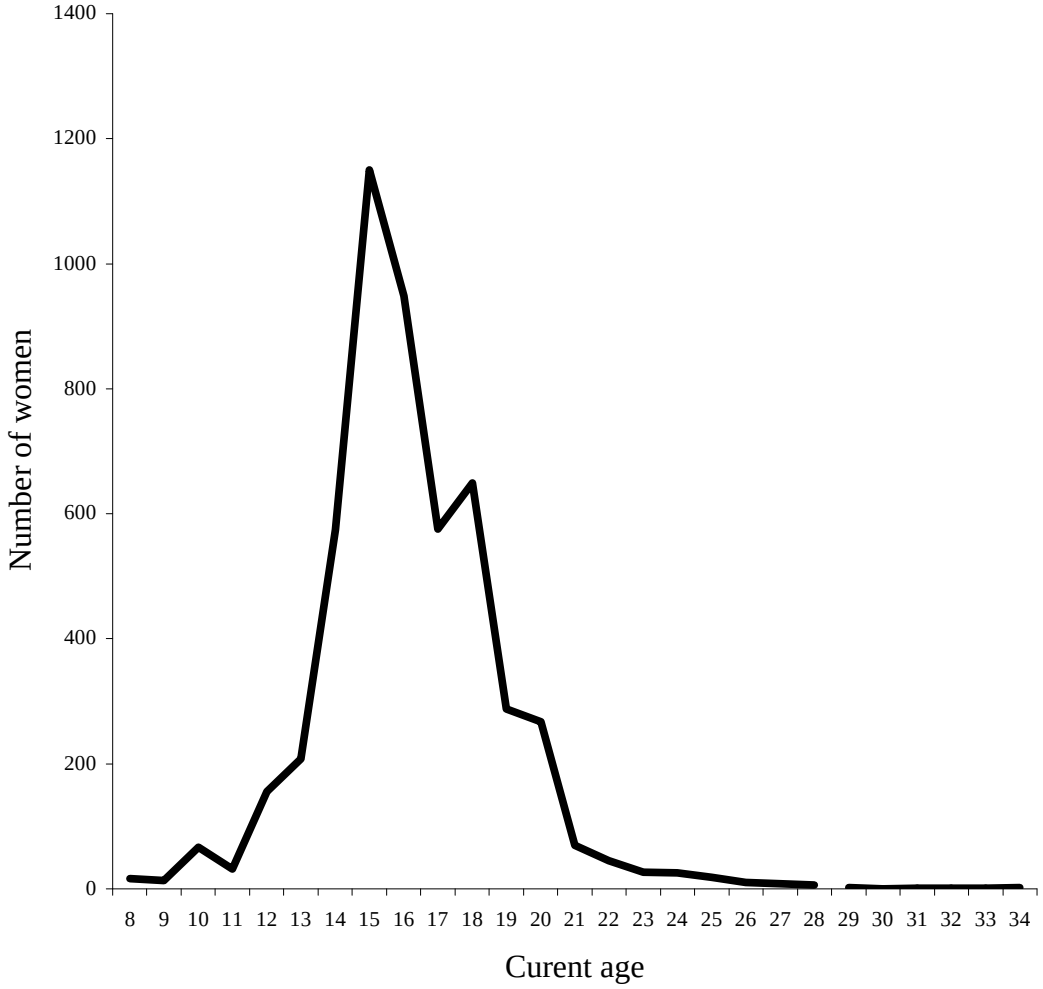
relationship is therefore an important indicator of the onset of child bearing. Traditionally in many African societies, having a sexual partner as a woman is associated with marriage and it is expected that sexual intercourse must strictly occur within married life (Mpiti and Kalule-Sabiti, 1985b).

Nevertheless, much literature suggests that age at first marriage is rising in many African societies while the age at menarche is believed to be declining (Rogo, 1986), and that premarital adolescent sexual activity is increasing (Cherlin and Riley, 1986). Therefore, if this change in premarital sexual behaviour is not compensated by an increase in premarital contraceptive use, then it is expected that there will be an increase in the proportion of adolescent births out of wedlock[15], as well as an increase in the prevalence of induced abortion (Gyepi-Garbrah, 1985b).

The sexual behaviour of unmarried adolescents can be hypothesised to be a result of the breakdown of traditional social controls by elders over the sexual behaviour of adolescents (Adeokun, 1990; Ocholla-Ayayo et al., 1990). This change can be attributed at least partly to the fact that educated youths now obtain knowledge from books that can be used to challenge the wisdom of the older generation. Furthermore, an individual decision-making has become more important because individuals are no longer accountable for their behaviour directly to the elders or to the community but rather to the judges in the courts (Bauni, 1990). This hypothesis of a breakdown of traditional controls over sexuality is supported by a survey done in Kenya in which over 60 percent of the respondents reported that they believed that the rules and norms restricting premarital and extramarital sex no longer apply today (Ocholla-Ayayo et al., 1990).

[15] Out of wedlock birth means those births to mothers who are not married at the time of the first birth.

Figure 13: Age at first intercourse by single years



Source: calculated from 1996 TDHS

An alternative theory is that unmarried teenagers use sexual relations and pregnancy to accomplish certain goals. For example, sexual relations may have economic benefits or might be a step towards marriage (Meekers, 1992). One of the problems with the existing literature on sexual behaviour is that the data often do not come from random samples but rather from selected groups, such as school children of a certain area.

However most researches have documented the consequences of adolescent and premarital pregnancies in sub-Saharan Africa (Njogu, 1991). The problems noted most often include dropping out of school (Mwateba et al., 1988), illegal abortion (Mashalaba, 1989), child abandonment (Dynowski-Smith, 1989), and high mortality among newly-born (Meekers, 1990). All in all, data from DHS provide a unique

opportunity to update the body of knowledge on sexual and reproductive behaviour in sub-Saharan Africa (Gage-Brandon and Meekers, 1993).

Table 16: Percentage distribution of respondents' age at first sexual intercourse by current age

Current age				*Had experience sexual intercourse*							
	Never	ever	N	At union	<15	15-17	18-19	20-21	22-24	25+	N
15-19	51.7	48.3	1,724	15.1	23.2	54.2	7.7				707
20-24	7.4	92.6	1,666	20.8	13.1	38.3	19.3	7.2	1.1		1,220
25-29	1.5	98.5	1,436	22.9	15.7	37.4	14.9	5.7	2.3	1.0	1,090
30-34	0.6	99.4	1,115	24.4	14.8	37.0	14.3	6.0	1.9	1.5	837
35-39	0.2	99.8	886	31.9	15.9	34.6	11.5	3.4	1.7	0.9	602
40-44	0.0	100	678	43.2	10.3	32.7	8.1	4.0	0.6	1.0	385
45-49	0.2	99.8	587	45.1	12.8	28.0	8.5	3.9	1.2	0.5	321
15-49	**13.0**	**87**	**8,092**	**26.7**	**15.2**	**37.9**	**13.3**	**4.8**	**1.4**	**0.7**	**5,162**

Source: calculated from 1996 TDHS

From Table 16 it is evident that a large proportion of women in Tanzania in every age group have the first sexual experience between ages 15 and 17. After adolescence, very few women in Tanzania are still virgin as less than half of adolescents are still virgin; only 7.4 percent have not had sexual intercourse by the age of 20. It is evident that the traditional practice of experiencing the first sexual intercourse on the day of union is dying out as the percentage of women who experienced sexual intercourse at the first time in union, dramatically decreases from older to younger cohorts.

By the age of 19, more than 80 percent of women already had their first sexual experiences. By the age of 24, only 13.6 percent of women in Tanzania are expected to be inexperienced in sexual intercourse. This is an indication that women in Tanzania engage in sexual activities at an early age. This finding can be supported by the result of the 1985 Tanzania national survey on adolescent fertility, conducted among urban youth aged 12 to 24 years which showed that more than 50 percent of the females surveyed were sexually active (Mwateba et al., 1988). The number of women, who had not experienced any sexual intercourse yet, decreases with age so that almost all women at 45 years had experienced sexual intercourse at least once in their lifetime. With the low level of contraceptive practice (12.5 percent) prevailing in the country now, this would imply early child bearing and consequently a high level of fertility.

Table 17: Mean age of respondents at first sexual intercourse by current age

Age group	*T10*	*T25*	*T50*	*T75*	*T90*	*Trimean*	*Spread*	*N*
15-19	12.8	14.2	15.4	16.5	17.5	15.3	1.8	707
20-24	13.4	14.9	16.4	18.1	19.6	16.4	2.5	1,220
25-29	13.2	14.7	16.1	18.0	19.8	16.2	2.8	1,090
30-34	13.3	14.7	16.1	18.0	19.9	16.2	2.9	837
35-39	13.2	14.4	15.7	17.5	19.3	15.8	2.9	602
40-44	13.5	14.6	15.7	17.5	19.3	15.9	2.8	385
45-49	13.2	14.4	15.6	17.5	19.5	15.8	2.9	321
15-49	**13.2**	**14.6**	**15.9**	**17.7**	**19.4**	**16.0**	**2.7**	**5,162**

Source: calculated from 1996 TDHS

As can be observed in Table 17 age at first sexual experience in Tanzania is low across the cohorts. The trimean, which is a more sensitive measure than the mean, shows that the average ages at first sexual relationship among Tanzanian women, is 16 years. By age 13.2, 10 percent of sexually experience women have experienced sexual intercourse and by age 19 only 10 percent of women are sexually inexperienced. . This low age at first sexual experience is an indication of prevalence of pre-marital sexual activities among Tanzanian women.

The slightly increasing trend of age at first intercourse in recent years is evident as the mean age at first sexual intercourse for older women (45-49) is 15.8 years while for younger ones (20-24) it is 16.4 years. The reason for this shift was the effect of attending schools. As pregnant schoolgirls are not allowed to continue with education, they are afraid of sexual activities and the consequences that might force them to leave school. The low level of mean age at sexual intercourse for the older women is due to the fact that the older cohorts had a low age at first marriage and so sexual relationship could start as soon as they got married. On the other hand, the younger cohorts marry comparatively late and premarital sexual activity is predominant among them (premarital births will be examined later).

Table 18: Odds ratio predicting that a woman had sexual intercourse before age 15

Variable	*Odds ratio*
Literacy	
Literate	.35***
Semiliterate	.67***
Illiterate	RC
Religion	
Moslems	RC
Catholics	.66***
Protestants	.63***
Others	.97
Place of Residence	
Urban	.74***
Rural	RC
Age	
15-19	1.93***
20+	RC

*** p<.001 (highly significant)

Source: calculated from 1996 TDHS

Table 18 shows the effects of literacy, religion, place of residence and age on the likelihood that a sexually experienced woman had first sexual intercourse before she reached age 15. It appears that illiterate women have a greater chance to start sexual activity before turning 15. Literate women in Tanzania are almost three times less likely to start sexual intercourse before reaching age 15 compared to illiterates. On the other hand, semiliterate women are 1.5 less likely to start sexual intercourse before turning 15 than illiterate women. Therefore, literacy can delay the first sexual intercourse of a Tanzanian woman; the relationship is significant. The main reason for literate women not to engage in sexual activities might be the fear of becoming pregnant.

It seems that Moslems are more likely to start sexual activities before the age of 15 compared to believers of other religious denominations. Protestants are 1.6 times less likely to start sexual activity before attaining age 15 as well as Catholics (1.5 times) and others (1.03 times) than Moslems; the relationship is statistically significant. Women residing in urban areas are 1.4 less likely to start sexual activities before attaining age 15 than their sisters in rural areas. In general, an illiterate adolescent Moslem woman residing in a rural area is most likely to experience her sexual intercourse before reaching the age of 15 compared to others.

Table 19: Mean age at first sexual intercourse for sub-Saharan Africa including selected developing countries

Country	*Year*	*T10*	*T25*	*T50*	*T75*	*T90*	*Tri-mean*	*Spread*	*N*
Benin	1996	13.6	14.7	16.1	17.7	19.1	16.2	2.3	2,970
CAR	1994	12.9	14.1	15.4	16.8	18.4	15.4	2.2	4,954
Comores	1996	13.5	14.9	16.7	19.1	21.8	16.9	3.5	908
Côte d'Ivoire	1994	12.7	13.9	15.1	16.4	17.8	15.1	2.0	5,853
Ghana	1993	13.9	15.0	16.3	17.8	19.3	16.4	2.3	3,149
Kenya	1993	12.9	14.4	15.9	17.8	19.6	16.0	2.6	5,017
Mali	1995	13.5	14.4	15.4	16.8	18.5	15.5	2.0	3,941
Tanzania	**1996**	**13.2**	**14.6**	**15.9**	**17.7**	**19.4**	**16.0**	**2.7**	**5,162**
Uganda	1995	12.7	14.0	15.3	16.9	18.5	15.4	2.3	4,958
Zambia	1996	12.9	14.2	15.5	17.1	19.0	15.6	2.5	4,996
Zimbabwe	1994	14.3	15.7	17.5	19.3	21.0	17.5	2.7	4,108
Egypt*	1995	-	-	-	-	-	-	-	-
Bangladesh*	1996	-	-	-	-	-	-	-	-
Brazil	1996	14.1	15.6	17.6	20.2	23.3	17.8	3.8	7,455
DR	1996	13.4	15.0	17.0	19.7	23.1	17.2	3.9	4,506

* The question was not asked.
Source: calculated from DHS III

It is seems that in all countries sexual intercourse begins before attaining age 15 as 10 percent of women had sexual intercourse experience between age 12.7 in Uganda and age 14.3 in Zimbabwe. There might be a direct relationship between the timing of first sexual intercourse and first birth as those countries which have lower age at first sexual intercourse (Table 19) posses lower age at first birth as well (Table 14). Mean age at first sexual intercourse ranges between 15.1 in Côte d'Ivoire to 17.5 in Zimbabwe. The information we get from the spread might assist us to draw a conclusion of the intensity of sexual activities within a country. In countries with a spread of - say 2 years - adolescents engage more frequently in sexual activities than those having a spread of more than 3 years. Therefore, a spread of 3.5 for the Comores may be attributed to Islamic attitudes towards restrictions on premarital sexual activities. Comores is an Islamic republic.

4.3.3. Age at First Marriage

Although marriage has a definite meaning in most African cultures, it is difficult to define in general terms due to a fact that marriage is based on different concepts for different societies. In contrast to the wedding (marriage ceremony) as a discrete event in Western societies, African customary marriage is a complex institution that generally

proceeds by stages, most of them characterised by the performance of prescribed rites. Marriage is a process composed of several stages between the preliminary rites and the full acceptance of the couple as a social unit (Van de Walle, 1968; United Nations, 1988). In this context it is difficult to determine when a union started.

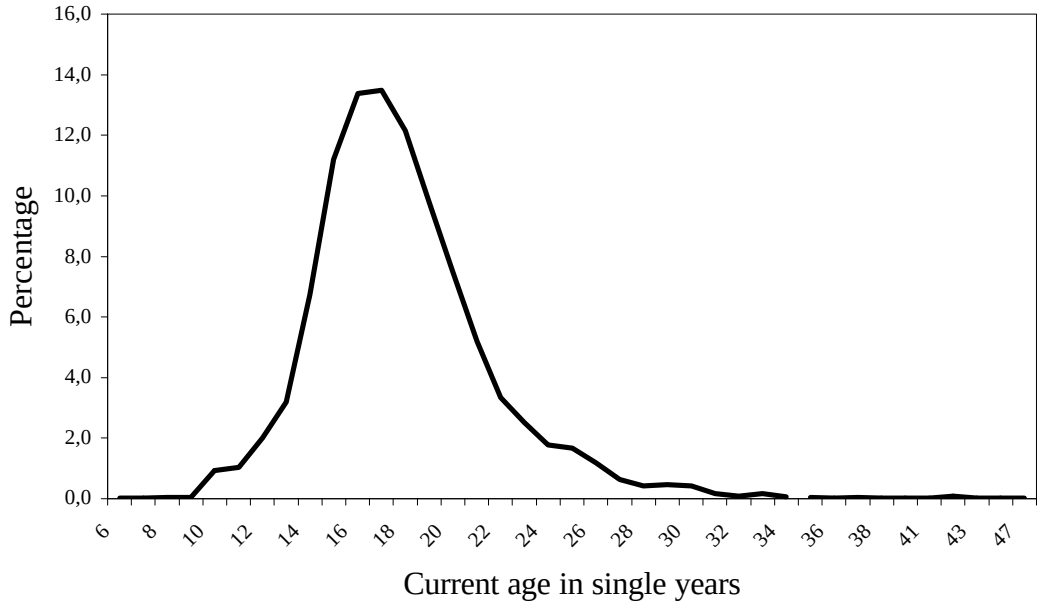
In Tanzania the type of marriage institution varies among the various ethnic groups and even within the same ethnic group there are tendencies to emphasise, elaborate or eliminate certain beliefs, practices or ceremonies. The traditional marriage always precedes either the civil or church/mosque weddings. It is usually the final stage in the marriage and cohabitation process, even though childbirth may precede the wedding ceremony. Wanyambo[16] for instance, have two types of traditional marriage. In the first type, a girl is taken to her future husband by force. Later this is followed by wedding ceremonies. However, this couple can go to the church/mosque at the later stage to formalise their marriage; that day then is the day of marriage a woman might refer to. Any births before formalising that marriage might be misquoted as premarital births although in a real sense they are not.

The second type of traditional marriage is a formal one, where parents make all necessary marriage arrangement including payment of bride price. At the end a girl is sent to the future husband. This type of marriages can also be taken to church for formalisation before a girl is sent to her future husband or at a later stage when a marriage certificate is handed out. Therefore, in this study marriage is taken in its broadest sense to embrace all forms of cohabitation. We will combine ‘living together’ with ‘currently married’ to form the married category as explained in chapter 3.

Tanzanians marry to have children, and marriage only has a meaning when a child is born and survives. Children, especially sons, are cherished as the means of cementing a marriage and perpetuating the family. Indeed, it is viewed as unusual if a child fails to come within the first year of marriage. Childless women or men are pitied or looked down upon in the society. Because of strong parental authority and traditions cum prescriptions about purity and premarital chastity, traditional Tanzanian marriages take place early and are arranged by the parents. The characteristics of agrarian economy, family organisation and socialisation structure as well as the levels of female education

also sustain early and universal marriage. In many societies age at first marriage, is practically synonymous with age of entry into sexual relations, where female chastity is culturally cherished. Thus it is a proximate determinant of the start of child bearing.

Figure 14: Age at first marriage in single years



Source: calculated from 1996 TDHS

Figure 14 shows that age at first marriage in Tanzania is generally low, with some women marrying as young as 6 years of age. This is common among coastal people where a man (husband to be), normally older than a wife to be, marries a young girl. Marriage is not consummated immediately, as this young girl does not start sexual intercourse with her husband immediately. She stays under the guardianship of her mother-in-law or the older wife until her first menarche. After her first menarche she is allowed to start sexual intercourse with her husband. Such incidences might deflate the age at first marriage in the TDHS data. This situation also makes it impossible to use age at first marriage as a proxy for exposure to the risk of pregnancy.

[16] Wanyambo is one of six ethnic groups found in the Kagera region.

Table 20: Percentage distribution of women age at first marriage by current age

				Married						
Ages	*Never*	*Ever*	*N*	*<15*	*15-17*	*18-19*	*20-21*	*22-24*	*25 +*	*N*
15-19	74.6	25.4	1,732	15.4	66.1	18.5				442
20-24	24.5	75.5	1,676	9.7	40.8	29.4	14.8	5.3		1,268
25-29	7.4	92.6	1,440	9.0	34.2	24.9	15.8	11.1	5.0	1,308
30-34	4.5	95.5	1,118	13.4	33.4	19.7	14.0	10.2	9.3	1,085
35-39	1.7	98.3	888	18.4	36.1	17.1	11.8	8.0	8.5	879
40-44	1.5	98.5	680	19.1	38.5	18.1	10.8	5.2	8.3	662
45-49	0.8	99.2	585	22.6	30.6	17.5	12.1	8.1	9.2	577
15-49	**23.3**	**76.7**	**8,120**	**14.0**	**38.1**	**22.0**	**12.8**	**7.6**	**5.6**	**6,221**

Source: calculated from 1996 TDHS

Table 20 shows that the proportion of women who marry before age 15 has been declining across the cohorts (the percentage of those ever-married women currently aged 45-49 is 22.6 compared to 8.9 percent for women in the youngest cohort 25-29). As already mentioned, adolescence will be dealt with later in Chapter 7. However, it is expected to have fewer cases of married women who are less than 20 years of age as most of them are still in schools. All in all this is a clear indication of a rising age at first marriage in Tanzania.

Table 21: Mean age at first marriage by current age

Age groups	*T10*	*T25*	*T50*	*T75*	*Trimean*	*Spread*	*N*
15-19	14.0	15.0	16.2	17.3	16.2	3.8	442
20-24	14.3	15.9	17.5	19.2	17.5	2.5	1,268
25-29	14.3	16.1	18.0	20.3	18.1	3.3	1,308
30-34	13.7	15.6	17.8	20.7	18.0	4.1	1,085
35-39	13.2	15.0	17.0	20.0	17.3	4.5	879
40-44	12.9	14.9	16.9	19.5	17.0	4.7	662
45-49	13.0	14.7	17.1	20.2	17.3	5.2	577
15-49	**13.7**	**15.3**	**17.3**	**19.6**	**17.4**	**3.8**	**6,221**

Source: calculated from 1996 TDHS

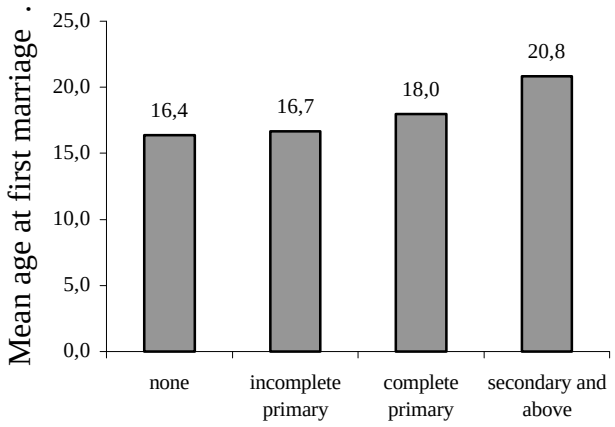
Table 20 also depicts two general characteristics of Tanzania nuptiality, namely early, and non-universal marriage. About 25 percent of Tanzanian women aged 15-19 were married at the time of the survey. The ever-married figures increase to 76 percent and 93 percent in the 20-24 and 25-29 age groups, respectively. However, not all women are married in age group 44-49. Therefore, one cannot say that marriage is universal in Tanzania.

Table 21 reveals that the mean age at first marriage is 17.4 years. 10 percent of Tanzanian women marry before they are 14 years old. By the age of 20, three quarters of the women are already in marital unions. The table further reveals that there has been a rising trend in age at first marriage in Tanzania, e.g. the trimean of 18.1, 18.0, 17.3, and 17.0 years for women aged 25-29, 30-34, 35-39, and 40-44 years, respectively. The younger cohorts marry at later ages compared to the older cohorts. This increasing trend in age at first marriage is observed in T10, T25, T50, T75 and even in the trimean. The mean age at first marriage increased from 17 years in the 40-44 cohorts to 18.1 years in the 25-29 cohorts. This increasing age at first marriage could be attributed to the fact that more and more women in Tanzania today are pursuing education compared to the past. With an increasing level of education, women engage in wage employment. In addition to this, their values and attitudes are modified and these factors tend to delay marriage. The women in the oldest cohort 45-49 years seem to have overstated their age at first marriage most likely as a result of memory lapse. This resulted in an unexpectedly high age at first marriage of 17.4 years compared to 17.3 years for women at the age of 40-44.

Further computations of the TDHS data (Figure 15) show that the median age at first marriage increases with the increase in the level of education of a woman. Women with no education have the lowest median age at first marriage namely 16.2 years, while those with primary school education have a median of 17.6 years. Women with secondary schooling have a median age of 9.4 years, women with an education higher than secondary schooling has a median age of 25.5 years. The low age at first marriage for women with no education could be attributed to the fact that marriage is the ultimate goal in their lives as soon as they mature. On the contrary, women with secondary education will marry later as they spend many years in school. Even after marrying, some of these women might not start child bearing immediately, as there are other important things like occupation, which might be competing with child bearing. In addition as far as most of them live in urban areas, their values have been modified by modernisation. All these factors might cause them to delay the first birth. In terms of place of residence, urban residents clearly demonstrate higher age at marriage relative to rural dwellers. Rural women enter and complete marriage at an earlier age than their urban sisters. Religion also influences age at marriage, especially among Moslems whose culture encourages earlier marriages than among Christians.

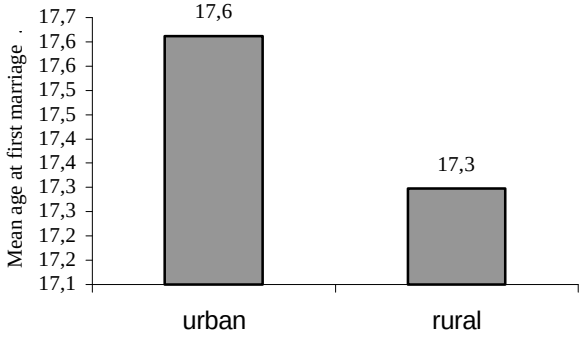
Figure 15: Socio-economic variables associated with age at first marriage

a) Education



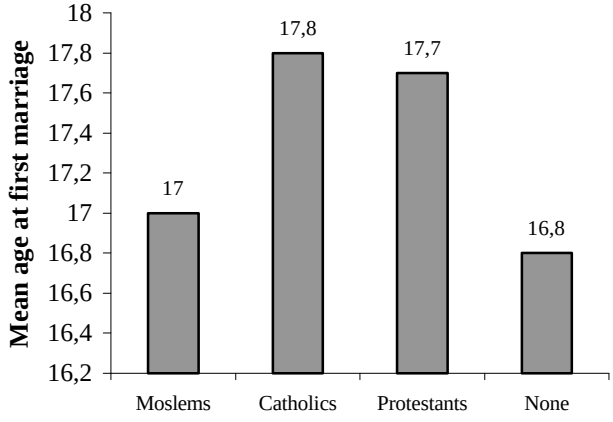
Source: calculated from 1996 TDHS

b) Place of Residence



Source: calculated from 1996 TDHS

c) Religion



Source: calculated from 1996 TDHS

Table 22: Logistic regression coefficients predicting the relative odds that a woman marries before exact age 15

Variable	*Coefficients*	*Odds ratio*
Constant	-1.782***	
Literacy		
Literate	-1.486***	.23
Semiliterate	-.361***	.70
Illiterate	RC	RC
Religion		
Moslem	RC	RC
Catholic	-.433***	.65
Protestant	-.285**	.75
Others	-.370**	.69
Place of Residence		
Urban	.134	1.14
Rural	RC	RC
Age		
15-19	.127	1.14
20+	RC	RC

*** p<.001 (highly significant)
** p<.01 (significant)
* p<.05 (less significant)
p>.05 (insignificant)
Source: calculated from 1996 TDHS

Table 22 shows the effects of literacy, religion, place of residence, and current age on the likelihood that an ever-married woman marries before she reached age 15. After controlling for the other variables in the model, it appears less likely for literate women to have married before the age of 15 than illiterate women. Literate women are 4 times less likely to marry before age 15 than illiterates; the difference is significant. Semiliterate women are 1.4 times less likely to get married before they reach age 15 compared with illiterates. This positive effect of literacy on age at first marriage can largely be attributed to the fact that educated women tend to marry at a later age than uneducated women as they stay in school for a longer period.

Moslems seem to have a great likelihood of marrying before age 15. Catholics appear to be 1.5 less likely to marry before age 15 than Moslem women. Protestant women are 1.3 less likely to marry before age 15; the difference is statistically significant. This may be consistent with the strong emphasis on premarital virginity in Islamic society. Urban

residents are 1.14 times less likely to marry before the age of 15 than rural women, but the difference is not statistically significant.

Table 23: Mean age at first marriage for sub-Saharan countries and other selected countries

Country	*Year*	*T10*	*T25*	*T50*	*T75*	*T90*	*T**	*Spread*	*N*
Benin	1996	14.2	15.8	17.6	19.7	22.2	17.7	3.4	4,445
CAR	1994	13.1	14.4	16.2	18.5	21.3	16.3	3.6	4,737
Comores	1996	13.1	14.9	17.2	20,1	23.8	17.4	4.3	1,862
Côte d'Ivoire	1994	13.4	15.0	16.9	19.6	22.8	17.1	4.1	5,964
Ghana	1993	14.8	16.2	18.0	20.2	22.8	18.1	3.3	3,672
Kenya	1993	14.1	15.7	17.8	20.2	22.7	17.9	3.6	5,260
Mali	1995	13.5	14.4	15.5	17.1	19.4	15.6	2.6	8,459
Tanzania	**1996**	**13.7**	**15.3**	**17.3**	**19.6**	**22.5**	**17.4**	**3.8**	**6,221**
Uganda	1995	13.2	14.7	16.5	18.7	21.1	16.6	3.5	5,965
Zambia	1996	13.8	15.3	16.9	19.0	21.6	17.0	3.3	5,989
Zimbabwe	1994	14.3	16.1	18.0	20.3	22.8	18.1	3.6	4,482
Egypt	1995	13.9	15.6	18.1	21.3	24.5	18.3	4.2	14,779
Bangladesh	1996	11.3	12.4	13.8	15.7	18.0	13.9	2.9	9,640
Brazil	1996	15.2	16.9	19.4	22.3	25.8	19.5	4.5	8,759
DR	1996	13.6	15.3	17.7	20.8	24.5	17.9	4.4	6,270

* Trimean
Source: calculated from DHS III

Mean age at first marriage in sub-Saharan Africa countries ranges between 15.6 in Uganda to 18.1 in Zimbabwe and Ghana. Women engage in marriage unions at an early age. Between the age of 13 to 14, 10 percent of women, who eventually got married, are already married. An interesting finding is Egypt where at the age of 13.9, 10 percent of woman have been married, but the mean age at first marriage is higher compared to other countries like Benin and Kenya. Bangladesh women seem to get married at the lowest age of all selected country. This might be attributed to the influence of Islamic faith in insisting on premarital virginity.

4.3.4. Primary Sterility

Sterility is the inability of a non-contracepting and non-lactating sexually active woman to have a live birth. The term infertility, sterility and infecundity are often used interchangeably regardless of the precise definition. However, demographic and medical definitions of these terms may differ substantially. For example in demographic terminology, primary sterility (primary infertility) is defined as the inability to bear any

children. Therefore according to this definition, primary sterility may arise because of the inability to conceive or the inability to carry a pregnancy to full term. One point to note is that sterility can only be considered for the non-celibate women.

In clinical studies on the other hand, infertility (sterility) is usually defined as the inability to become pregnant or to achieve fertilisation. Secondary sterility, which is highly correlated with primary infertility, is the inability to bear a child after having an earlier birth. Furthermore, the actual difference between infertility and infecundability is that infertility suggests simply a lack of demonstrated fertility rather than the physiological inability to reproduce. Infecundibility refers to inability to conceive or to bear a child after being exposed to the risk of conception for a fixed length of time.

While the epidemiological definition recommended by the World Health Organisation depends on a two-year period of exposure, the demographic measures cover a five-year period. One of the more serious problems with sterility measures that are based on the fertility of couples at the end of the child bearing period is that these measures do not reflect recent trends in sterility. The inclusion of a relatively small number of women over age 40 in the TDHS (15.6 percent of all sampled women in 1996) may influence sampling errors resulting in imprecise estimates.

Sterility might be due to the normal ageing process or to the consequences of a variety of diseases or malfunctions of the reproductive process (Vaessen, 1984). Although the causes of sterility are diverse, it is generally agreed that sexually transmitted diseases (STDs) are the major preventable cause of sterility (Farley and Besley, 1988). In particular, STDs have been implicated as the single major cause of the high level of primary and secondary sterility in sub-Saharan Africa (Caldwell and Caldwell, 1981). STDs may result in tubal obstruction, a problem that may also be caused by infections related to pregnancy and abortion (Cates et al., 1985). Infection is particularly likely after unhygienic obstetric or abortion practices.

There is no direct way of measuring primary sterility from the TDHS data. However, since most women marry and in practice there is no control to prevent a first birth, childlessness or the failure to conceive among married women may be taken as an indicator of primary sterility or very marked subfecundity. The assumption is that

marriages are stable, and abstinence is rare for married couples since marriage is an institution for producing children. And voluntary childlessness is not a common feature among Tanzanian women. The study will consider the proportion remaining childless as a fair indicator of either primary sterility or very marked sub-fecundity if the duration of marriage is more than 5 years without any live birth.

About 9 percent of the ever-married women aged 15-49 years reported that they never had a live birth. This is reduced to about 3 percent for those who had been married for at least five years. The percentages of currently married women that experienced no live birth were about 10 percent and were reduced to 2.4 percent for those who have been married for five years and more.

Table 24: Percentage of women, who remain childless by marriage duration and current age

a) Ever married women

Current	*Duration of Marriage*									
age	0-4	5-9	10-14	15-19	20-24	25-29	30+	5+	Childless	Ever married
15-19	40.0	0.3						0.3	40.3	310
20-24	12.2	2.0	0.2					2.2	14.4	923
25-29	2.7	2.3	0.8					3.1	5.8	994
30-34	1.0	1.1	0.5	0.5	0.1			2.3	3.3	791
35-39	0.3	0.5	1.2	0.5	1.4			3.6	3.9	587
40-44					0.8	0.5		1.3	1.3	375
45-49				0.6	0.6	0.3	0.6	2.2	2.2	315
15-49	**6.4**	**1.3**	**0.5**	**0.2**	**0.3**	**0.1**	**0.1**	**2.4**	**8.8**	**4,295**

b) Currently married women

Current	*Duration of Marriage*								
age	0-4	5-9	10-14	15-19	20-24	25-29	30+	5+	Currently married
15-19	44.1	1.0	0.0					1.0	401
20-24	13.9	1.8	0.2					2.0	1,131
25-29	3.0	2.3	0.9					3.2	1,184
30-34	0.8	1.0	1.1	0.5	0.1			2.7	947
35-39	0.3	0.5	0.9	0.8	1.4			3.6	740
40-44	0.0	0.2	0.2	0.2	0.7	0.5	0.2	2.0	561
45-49	0.0	0.0	0.0	0.4	0.4	0.4	1.1	2.3	447
15-49	7.0	1.2	0.6	0.3	0.3	0.1	0.1	2.6	5,411

c) Women married for more than five years

Current age	*Ever married women*		*Currently married women*	
	No live birth	N	No live birth	N
15-19	26.7	15	28.6	14
20-24	4.2	526	3.2	467
25-29	3.4	1123	2.7	993
30-34	2.4	1010	1.9	896
35-39	3.3	861	2.9	729
40-44	1.8	666	1.3	556
45-49	1.7	578	1.3	445
15-49	**2.9**	**4779**	**2.4**	**4,100**

Source (a,b,c): calculated from 1996 TDHS

From Table 24 (a, b, and c) it is evident that the incidence of primary sterility is very low in Tanzania as only 2.9 percent of the ever-married women suffer this debility. It seems that this is a realistic estimate as the percentage of childless women who have been married for 25 or more years and are still currently married, amount to nearly the same figure (2.4 percent). But this figure might give a misleading estimate due to the fact that never married women were excluded in the analysis. However from the table, the incidence of primary sterility decreases with increase in duration of marriage. For example primary sterility decreases from 7 percent for married less than 5 years to 0.1 percent for those married for 30 years and more. Surprising enough, sterility tends to decrease with increasing age. For instance, 4.2 percent of ever-married women aged 20-24 were reported childless and a percentage decrease to 1.7 percent for ever married women age 45-49. This may lead us to conclude that either the choice of the period was too short to capture primary sterility hence this was secondary sterility or primary sterility is on the increase now in Tanzania. All in all, primary sterility is not very widespread.

To be precise let us use a refined method of investigating primary sterility by examining currently married women in their first union, who were married for five or more years before the survey and who are still childless.

Table 25: Percentage of childless currently married women in the first union

Age group	*Mmarried for 5+*	*Regardless of duration*	*Married and in first union*
15-19	0.6	42.0	385
20-24	0.8	14.0	1,012
25-29	1.8	4.6	995
30-34	1.7	2.4	732
35-39	2.5	2.9	522
40-44	1.2	1.2	390
45-49	0.9	0.9	320
15-49	**1.4**	**8.9**	**4,356**
35-49	1.7	1.9	1,232

Source: calculated from 1996 TDHS

Table 25 shows childlessness based on successively refined denominators, starting with ever-married women (Table 24) and then adding in turn the conditions that the respondent was currently married at least for five years and was in her first union. The main reason for using women still in the first union, was due to the fact that the TDHS did not collect data on complete marriage histories or sexually active women. In this circumstance it is not easy to identify women who have been continuously exposed to the risk of conception for a period of five years unless they are still in their first marriage. However, measures based on currently married women may slightly underestimate sterility if couples without any children are more likely to get divorced or separated.

Table 25 confirms the earlier finding (Table 24) that sterility in Tanzania is very low. It seems that 2 percent of married women in their first union for not less than five years are infertile. The relatively low level of infertility in Tanzania does not correspond with several studies, which have found a uniquely high level of sterility in sub-Saharan countries (Bongaarts et al., 1984; Caldwell and Caldwell, 1983). Farley and Besley (1988) went further to estimate primary sterility of about 10.1 percent for sub-Saharan Africa. Bongaarts et al. (1984) reported particularly high levels of sterility in most of Central Africa and East Africa of about 12-20 percent childlessness for women at the age of 45-49 years. It was previously thought that there was a core rate of sterility of about 10 percent due to genetic, anatomical, and endocrinological causes (Veevers, 1972). These findings might have exaggerated the real situation.

4.3.5. Contraceptive Use

Contraceptive use will be fully discussed in Chapter 6. However, it is important to discuss the use of contraceptives as a proximate determinant of age at first birth. Contraception might be practised in order to delay the first birth especially for women who marry late. In their case it would be preferable not to have premarital births as most women would like to get married before child bearing in Tanzania. In their study of induced abortion in hospital settings in Tanzania, Justesen et al. (1992) found that the proportion of unwanted pregnancies was strongly correlated with marital status, and decreases from 96 percent of single women to 31 percent of married women. They further found that the main reason for an unwanted pregnancy for never married women was being single, while married women had unwanted pregnancies due to the fact that either they already had the care of a young child or they wished to stop child bearing (Justesen et al., 1992). This confirms that women in Tanzania prefer not to have premarital births.

In this section we will try to investigate the contraceptive use in delaying first birth. However the TDHS did not collect information on contraceptive use before first birth for ever given birth. The only way is to assume that women who have already experienced a live birth had the same experience as the women who are currently contracepting in order to delay their first birth. In doing so, we further assume that marriage is an institution for generating children in a Tanzanian context, hence deliberate effort to delay first birth does not exist. In lieu of this assumption, investigation of contraceptive use among women who are not in union, but already have experienced sexual intercourse, who never had live births and or are not pregnant will give us the estimation of contraceptive use to delay first birth.

Table 26: Percentage distribution of non-pregnant unmarried sexually active women who use contraceptive to delay first birth by current age

Current age	*Contraceptive method*			
	Not Using	Traditional	Modern	N
15-19	86.6	4.8	8.6	291
20-24	83.6	5.3	11.2	152
25-29	76.3	15.8	7.9	38
30-34	92.3	7.7		13
35-39	100			10
40-44	100			6
45-49	100			6
15-49	**85.7**	**5.6**	**8.7**	**516**

Source: calculated from 1996 TDHS

It seems most women use modern methods rather than traditional ones to delay first birth. Table 26 shows that 8.7 percent of women use modern methods, 5.6 percent use traditional methods[17] of contraception to delay the first birth in Tanzania. However, it should be noted that the vast majority of women (86 percent) do not use any contraceptive method at all to delay their first births. In total 14 percent of women in Tanzania do something to protect first birth. In general unmarried sexually active women under 35 years of age seem to be the ones interested in delaying first birth, while older women aged 35 and over do not do anything to delay their first births. This might lead to the conclusion that women in Tanzania over 35 years are no longer hoping to get married and might not care any longer about premarital births as men in Tanzania prefer to marry young ones.

According to Table 26, contraceptive use increases with age for unmarried women less than 30 years. However, adolescents use more modern methods than other groups do. This is an indication of the acceptance of modern methods in recent years. Let us investigate specific methods used by unmarried women to delay first birth.

[17] Modern methods include pill, IUD, injections, barriers (diaphragm, foam, jelly), condom, female sterilisation and Norplant. On the other hand, traditional methods include periodic abstinence, withdrawal, Billing method (mucus), calendar method and others.

Table 27: Percentage distribution of specific method used by current age

Age	*Not using*	*Pill*	*Inj*	*DFJ*	*Condom*	*PA*	*WD*	*Strings*[18]	*N*
15-19	86.6	2.7	0.7	0.3	4.8	4.5		0.3	291
20-24	84.1	2.6			7.9	5.3			152
25-29	74.4	5.1			5.1	12.8	2.6		38
30-34	92.3					7.7			13
35-39	100.0								10
40-44	100.0								6
45-49	100.0								6
15-49	**85.7**	**2.7**	**0.4**	**0.2**	**5.4**	**5.2**	**0.2**	**0.2**	**516**

Inj = Injection; DFJ = Diaphragm, Foam and Jelly; PA = Periodic Abstinence;
WD = Withdrawal
Source: calculated from 1996 TDHS

Table 27 shows that unmarried women mostly use condoms to protect them from premarital first birth. This can also be attributed to STD/AIDS control programs which emphasis the use of condoms (5.4 percent). The second popular contraceptive use of women in Tanzania to delay their first birth is periodic abstinence (5.2 percent). While 2.7 percent of women who want to delay their first births use pills, less than one percent use injections, and only adolescents use diaphragms as well as foams or jellies. These findings call for a review of family planning policy in Tanzania in order to accommodate adolescents and other never married women in the programme.

4.3.6. Induced Abortion and Early Pregnancy Wastage

The incidence of induced abortion and early pregnancy wastage before the first birth can delay the age at which child bearing begins. Therefore, it is one of the proximate determinants of age at first birth, too. Induced abortion is an illegal practice in Tanzania although unqualified paramedical personnel under poor hygienic conditions may secretly perform it[19]. These abortions always go unnoticed unless serious and fatal

[18] Some women tie a special string around their waist. They believe the string to protect them from pregnancy.

[19] Regulations that require schoolgirls to give up their schooling when they become pregnant encourage the practice of induced abortions in Tanzania. Mostly unmarried young females out of school systems undergo abortions to avoid premarital births, while married women might abort to avoid unwanted children. It is also possible that ever-married women who become pregnant from someone other than their partner or husband are in need of abortion too.

complications develop and such patients are rushed to hospital where such cases must be recorded. As explained in Chapter 2, no attempt has been made in this study to assess the extent of the contribution of miscarriages, still births and deliberate abortion that occurred before the birth of the first child. This is due to the fact that no question was asked on the incidence of abortion and the pregnancy wastage and so, analysis of this variable is not possible in this study. However in this study we will use other studies to explain the magnitude and consequences of induced abortion as it contributes to infection, infertility, and mortality among young women.

Direct estimates of national levels of induced abortion are difficult to obtain except where the procedure is legal and where reporting systems function well. The WHO (1994) estimated that 3.7 million unsafe abortions are performed each year in sub-Saharan Africa (26 per 1,000 women). It is documented that unsafe abortion rates in sub-Saharan Africa are high and rising (Mashalaba, 1989; Leke, 1989; Salter et al., 1997). At the Kenyatta National Hospital in Nairobi, one ward admits 20-40 cases of incomplete abortion each day (Rogo and Nyamu, 1989).

In many countries, the majority of women seeking to terminate their pregnancy are single adolescents who wish to continue school or employment, or to wait to have a child until they can support one. In their study of 1,800 never married young people aged 14-25 in Nigeria, Nichols et al. (1986) reported that nearly half the female students and two–thirds of the nonstudents had been pregnant and nearly all had terminated their pregnancies with induced abortion. Mirembe (1994) documents that 68 percent of abortion patients at a local teaching hospital in Uganda were 15-19 years of age, and 79 percent were still in school. In a random sample of 300 women with early pregnancy loss admitted to Muhimbili Medical Centre, the teaching hospital in Dar es Salaam, Tanzania, Justesen et al. (1992) observed that 94 percent had induced abortion and that most of them were young and unmarried and their pregnancies were unwanted.

Legalising abortion might not be a perfect solution for prevention of unsafe abortions especially for first births as unsafe abortions also take place in some developing countries where abortion is legal. For example, in India abortion is legal, and yet many women seek abortions outside the formal health system because medical facilities

equipped to provide safe abortion are rare. Even where services are available in India, problems with confidentiality, quality, and cost prevent women from using them. In addition, many people are unaware of the fact that abortion is legal (Chandrasekhar, 1994; Henshaw, 1990; Pillai, 1993; World Bank, 1996). Of the estimated 5.3 million abortions induced in India in 1989, 4.7 million took place outside approved health care facilities and thus were potentially unsafe (Jesani and Iyer 1993). In Turkey, where abortion is legal, it must be performed or supervised by obstetrician-gynaecologists, which makes safe abortions inaccessible to most rural women (McLaurin et al., 1991). In Zambia, abortion is legal but many women and service providers are unaware of its legality. Moreover, legal safe abortion is inaccessible to most women because they must obtain the consent of three physicians (Likwa and Whittaker, 1994). Thus for every woman in Zambia obtaining a legal abortion in 1991, five sought emergency treatment for complications of unsafe induced abortions (Bradley et al., 1991).

Abortion complications account for an estimated 13 percent of all maternal deaths in Africa according to the 1994 WHO report. In some countries, hospital-based studies report much higher percentages. For example in Ethiopia, a hospital-based study estimated that abortion complications accounted for nearly 40 percent of maternal deaths (Yoseph and Kifle, 1988). In Nigeria during the 1980s at two teaching hospitals, abortion complications accounted for 20 percent and 35 percent of maternal deaths respectively (Okonofua et al., 1992). At a third hospital in Nigeria 37 percent of gynaecologic deaths were due to abortion complications (Adewole, 1992). Rogo (in Jacobson, 1990) estimates that 20 percent of maternal deaths in East and Central Africa, and as many as 54 percent in Ethiopia were due to abortion complications.

Untrained practitioners perform induced abortions or the woman induces the abortion herself. In Ethiopia, unskilled non-medical persons performed 92 percent of the illegal abortions (Ethiopia Country Paper, 1994). Leke (1989) reports that Cameroon women who do not go to traditional practitioners use local herbs and corrosive substances like potassium permanganate. According to Archibong (1991), methods used in Nigeria include sharp metal rods and hazardous chemicals. In Zambia, women are known to use twigs, drink detergents or gasoline, or take large doses of chloroquine or malariaquine (Castle et al., 1990).

Most common abortion complications are incomplete abortion, sepsis, haemorrhage, and intra-abdominal injury (Aggarwal, 1984; Konje et al., 1992; Ladipo, 1990; WHO, 1994). Except for intra-abdominal injury, all complications can result from either spontaneous abortion (miscarriage) or induced abortion; if left untreated, each can lead to death (Kamau, 1990). Women surviving immediate abortion complications often suffer life-long disability or face elevated risk of complications with future pregnancies (Herz and Measham, 1987; Liskin, 1992).

When tissue remains in the uterus after either miscarriage or unsafely induced abortion, women suffer 'incomplete abortion' - the most common abortion complication. Typical symptoms include pelvic pain, cramps or backache, persistent bleeding, and a soft, enlarged uterus (Stubblefield and Grimes, 1994; WHO, 1995). Septic abortion results when the endometrial cavity and its contents become infected (Ladipo, 1990). Usually this occurs after contaminated instruments were inserted into the cervix or when tissue remains in the uterus (Mccauley and Salter, 1995). In addition to suffering the general symptoms of incomplete abortion, women with sepsis have fever, chills, and foul-smelling vaginal discharge while bleeding might be either slight or heavy (WHO, 1995). The first signs of septic abortion usually appear a few days after the miscarriage or unsafe abortion. The infection can quickly spread from the uterus to become a generalised abdominal sepsis. High fever, difficult breathing, and low blood pressure often indicate a more extensive infection (Sweet and Gibbs, 1990).

Some techniques to induce abortion, such as sharp curettage or inserting sticks or other objects into the cervix can result in intra-abdominal injuries that cause heavy bleeding. Herbs, drugs, or caustic chemicals swallowed or placed into the vagina or cervix can cause toxic reactions and also lead to haemorrhage. The risk of post-abortion haemorrhage increases with gestational age, as well as with the use of general anaesthesia during unsafely induced abortion (Chaudhuri, 1992).

When instruments are inserted into the cervix to cause abortion, the cervix, the uterus, or other internal organs can be cut or punctured. The most common injury is perforation of the uterine wall. The ovaries, fallopian tubes, bowel, bladder, or rectum also can be damaged (WHO, 1994). Intra-abdominal injury can cause internal haemorrhage with little or no visible vaginal bleeding. Sepsis and haemorrhage resulting from spontaneous

abortion or unsafely induced abortion often are the most common reasons that women in developing countries seek treatment in hospital obstetric and gynaecologic wards (Ross and Frankenberg, 1993). In Kenya, for example, two hospital-based studies conducted during the 1980s found that women with post-abortion complications accounted for 60 percent of all gynaecological admissions (Aggarwal and Mati, 1982).

In addition to causing many deaths and much suffering, unsafe abortion complications consume a large portion of health-care budgets and scarce medical resources. In some areas for example, large amounts of resources, such as blood supply, are used for treating complications of unsafe abortion (Gyepi-Garbrah et al., 1985; Jacobson, 1994). It seems that the only solution for overcoming this human tragedy is to encourage the use of contraceptives rather than legalising abortion for a poor developing country like Tanzania.

4.4. Interval between First Marriage and First Birth (Premarital first Births)

Marriage though a very important landmark in fertility, does not necessarily mark the beginning of exposure to sexual activities (see discussion before). This analysis will shed light on the rate at which women start child bearing before and after first marriage. However, for the computation we assume that child bearing occurs strictly within marriage and any birth occurring before marriage will show negative interval. X represents those births which occurred before first marriage. Y represents occurrence of births within marriage but less than 9 months after first marriage, which means the conception of these births, was outside marriage. Z represents the interval between first marriage and first birth of more than 9 months - in other words, this represents women who had their first conception in marriage. X and Y represent premarital conception, or those pregnancies occurring before marriage.

Table 28: Percentage of ever married women who had ever given birth by current age

Current Age	*X*	*Y*	*Z*	*Premarital Conception*	*Total ever giving birth*
15-19	9.2	16.9	73.8	26.1	260
20-24	12.6	19.0	68.4	31.6	1,087
25-29	18.3	18.6	63.1	36.9	1,260
30-34	20.7	18.1	61.3	38.8	1,035
35-39	16.1	15.4	68.4	31.5	843
40-44	15.0	16.7	68.3	31.7	659
45-49	13.0	19.1	68.0	32.1	571
15-49	**16.1**	**17.8**	**66.1**	**33.9**	**5,715**

X = first births occurred before first marriage for ever married women; Y = first births within marriage but less than 9 months after first marriage; Z = first birth of 9 months or more after the first marriage
Source: calculated from 1996 TDHS

Table 28 reveals that almost 34 percent of ever married Tanzania women had their first conception before marriage. Out of those premarital conceptions, 16 percent are among married women who reported having their first birth before marriage also known as illegitimate birth for ever married women, and 18 percent are women who conceived their first pregnancy outside marriage but were married before the first birth.

Premarital birth increases with age for ever-married women less than 35 years, whereas it decreases with increasing current age. This finding can be associated with the results of section 4.2.6 that women less than 35 years of age are the only ones who use contraceptive to delay first birth while older women by this time have had their first birth, but if not, might be interested in having a child even outside wedlock. It is interesting also to note that marital births decrease with age. This may be attributed to the chance of getting married after the adolescent period.

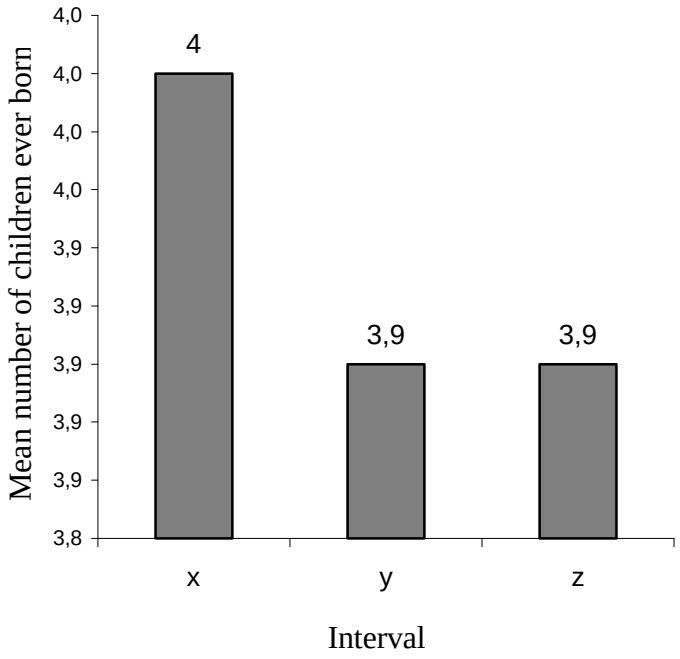
Table 29: First marriage to first birth interval (in months) by current age

Percentile	*Current age*							
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	**15-49**
T10	5.6	4.4	4.2	4.4	4.5	4.8	4.3	**4.5**
T25	9.4	8.9	8.9	8.8	9.4	9.5	8.8	**9.0**
T50	13.0	13.0	13.0	13.4	14.3	13.6	14.0	**13.4**
T75	19.2	21.6	21.0	22.5	23.9	22.4	24.6	**22.1**
T90	27.2	33.8	35.1	37.5	42.3	36.7	43.3	**36.8**
Trimean	13.6	14.1	14.0	14.5	15.5	14.8	15.3	**14.5**
Spread	9.4	14.2	14.7	16.4	18.0	15.8	17.2	**15.6**

Source: calculated from 1996 TDHS

Table 29 indicates estimates derived from life table analysis of data for all ever married women in order to investigate premarital births as found in Table 28 in a refined way. Here the series of quantiles Tx represent the number of months elapsed since marriage by which x percent of women had given birth to their first child. In other words, this table represents data on interval length between the first marriage and the first birth. The average interval from first marriage to first birth is 15 months, an indication that most of first births occur in marriages. However, 10 percent of ever-married women have had their first birth by 4.5 months of their marriage and 25 percent by 9 months. This is an indication that for all women in Tanzania who had their first live births, 25 percent were premarital pregnancies. By 3 years (36.8 months), 90 percent of the ever-married women have had their first birth. In other words, only 10 percent of women have not had their first child after 3 years of their first marriage.

Figure 16: Mean number of children ever born to ever-married women according to interval between age at birth and marriage



Key: **X =** first births occurred before first marriage for ever married women

Y = first births within marriage but less than 9 months after first marriage

Z = first birth of 9 months or more after the first marriage

Source: calculated from 1996 TDHS

Figure 16 suggests that fertility for those, who had their first live birth out of wedlock, is high compared to others. This finding supports the evidence of high rate of premarital births as already indicated earlier. This could be attributed to the early age at which sexual activities among Tanzanian women begin coupled with the low level of contraceptive prevalence to delay first birth. With increasing age at first marriage, premarital births are bound to increase if stern measures are not taken.

Table 30: Percentage of women who had ever given birth by current age

Age	*Never married*	*X*	*Y*	*Z*	*Premarital Conception*	*Premarital Birth*	*Total ever giving birth*
15-19	28.2	6.6	12.2	53.0	47.0	34.8	361
20-24	12.9	11.0	16.5	59.6	40.4	23.9	1247
25-29	4.7	17.5	17.7	60.1	39.9	22.2	1322
30-34	3.7	19.9	17.4	59.0	41.0	23.6	1075
35-39	1.4	15.9	15.2	67.5	32.5	17.3	855
40-44	1.3	14.8	16.5	67.4	32.6	16.2	668
45-49	0.5	12.9	19.0	67.6	32.4	13.4	574
15-49	**6.4**	**15.0**	**16.7**	**61.9**	**38.1**	**21.4**	**6102**

X = first births occurred before first marriage for ever married women; Y = first births within marriage but less than 9 months after first marriage; Z = first birth of 9 months or more after the first marriage;
Premarital first conception = Never married +X + Y;
Premarital first birth = Never married + X;
Legitimate first conception = Z; Legitimate first birth = Y + Z
Source: calculated from 1996 TDHS

Table 30 shows that the total of premarital first conceptions in Tanzania was almost 40 percent for women who ever gave birth in the 1996 TDHS. Out of those premarital first conceptions, almost 7 percent are never married women who reported having had a birth; 15 percent are married women who reported having their first birth before marriage; 17 percent are women who conceived their first pregnancy outside marriage but were married before the first birth. Therefore, 22 percent of women in Tanzania had premarital first birth, although premarital conception amounted to 40 percent of all conceptions.

Studies by Hobcraft and McDonald (1984) in 28 countries in Africa, Asia and America using World Fertility Survey data showed that at least 10 percent of women in most countries surveyed reported a first birth before 9 months of marriage. Our finding is within the range and supports the evidence of a high rate of premarital births and conceptions in Tanzania. This could be attributed to the early age at which sexual activities among Tanzanian women begin, coupled with the low level of contraceptive practice to delay first birth.

It seems that premarital first births are currently increasing, because premarital first births increased from 32 percent 30 years ago to 47 percent in recent years. However, the percentage of women, who became pregnant and eventually were married, also increased for the same period from 13 percent to 35 percent of all women who gave birth in Tanzania. This might be attributed to modern men's guile in preconditioning a

premarital sexual relationship with a young girl to test if the intended wife is fecund. Secondly the prevailing low age at first sexual intercourse can be a cause of premarital births. Never married births have been increasing greatly for the same period from less than 1.0 percent to 28 percent of all first births in Tanzania. However, in section 4.2.6 we saw an increase in contraceptive use to avoid premarital births for unmarried women. If all efforts are directed towards the provision of contraceptives to unmarried women in Tanzania, unwanted premarital births might be avoided to some extent.

4.4.1. Covariates of Age at First Birth

Age at first birth, as already discussed, could be influenced directly by proximate determinants. However, there are also the socio-economic characteristics which act through the proximate determinants to indirectly influence the age at which child bearing begins. The socio-economic factors that will be analysed in this study include education, type of place of residence, and religion.

Although the impact of these socio-economic variables is frequently emphasised, there is no doubt that the reverse situation also might be true. For example, due to the incompatibility of child bearing with school attendance, and in many societies with wage-earning employment outside the home, the timing of child bearing can influence the education and employment experiences of young women. This section will focus on how these factors influence age at first birth. At the end of this chapter, a multiple regression analysis will be carried out to determine the contribution of each factor on age at first birth. The effect of age at first birth on fertility will be investigated in the next chapter.

4.4.2. Place of Residence

Urbanisation and its concomitant modernising effects are believed to have a depressing effect on age at first motherhood. People who migrate from rural to urban areas are mostly those with education who want to elevate their work status or look for a better life in urban areas. As such, women residing in urban areas will obviously have more education and be in the formal sector of the economy. Table 31 shows the mean age at first birth according to type of place of residence.

Table 31: Mean age at first birth by type of place of residence

Place of Residence	*T10*	*T25*	*T50*	*T75*	*T90*	*Trimean*	*Spread*
Urban	14.8	16.5	18.2	20.3	22.8	18.3	3.2
Rural	14.8	16.4	18.2	20.2	22.6	18.3	3.2

Source: calculated from 1996 TDHS

Table 31 does not show evidence of a rural-urban differential in age at first birth. The mean age at first birth according to the TDHS data is the same, 18.3 years for the urban and rural women as well. This seems to indicate that in Tanzania child bearing does not depend on place of residence. The age at which 10 percent of the urban women get their first birth is the same as their rural counterparts namely 14.8 years.

It was expected that women in rural areas would have a lower age at first birth than their urban sisters for the following reasons: Urban women are more likely to practise contraception than their rural counterparts as shown earlier. Furthermore, the values and attitudes of the educated urban women have been modified through modernisation. Rural women on the other hand still adhere to the traditional norms, values, beliefs and practises, which attach a lot of importance to marriage and reproduction. They will therefore start child bearing early so as to meet societal expectations. In Tanzania it seems that is not the case. This might be attributed to UPE (Universal Primary Education program) and Kiswahili which is an official medium for communication among all Tanzanians.

In order to account for the difference between urban areas in general and the city of Dar es Salaam in particular, it is necessary to separate one from the other. After the separation, we have different results than in Table 31. Table 32 shows that urban women (not residents of Dar es Salaam) have a higher mean age at first birth (almost 3 months) and rural women have a lower mean age at first birth of 18.3 years. The findings reveal another unexpected result: 10 percent of Dar es Salaam women already gave birth by 14.4 years. Women in other urban areas reached the same figure at 15.2 years. 50 percent of rural resident women have given birth by the age of 18.3, urban women resident elsewhere than Dar es Salaam at the age of 18.4 and women residing in Dar es Salaam at the age of 17.9 years. This means that half of the Dar es Salaam women have their first children at a younger age than rural or other urban women. Considering 90 percent of the sampled women, we get the following results on the mean

age at first birth: 22.6 years (rural women), 23.2 (urban, not resident of Dar es Salaam) and 21.8 years (Dar es Salaam women) respectively. Dar es Salaam, the capital of Tanzania, has the lowest mean age at first birth. According to our assumptions, this big city was expected to have the highest mean age at first birth.

The bias might be in the TDHS data since 90 percent of Dar es Salaam women sampled were Moslems. As we concluded earlier, Moslem women are more likely to get their first child earlier than any other religious denomination. Therefore, the unexpected low age at first birth might be due to religion. Another reason might be the rural-urban migration for unmarried pregnant adolescent who are rejected by their families or young women who come to Dar es Salaam in order to find petty jobs. Since unemployment is high in the capital, a lot of them end up as prostitutes. Since contraceptives are neither available nor affordable to these young rural women, unprotected sex leads to motherhood at young ages – not to speak of STDs and HIV.

Table 32: Mean age at first birth by type of place of residence

Place of Residence	*T10*	*T25*	*T50*	*T75*	*T90*	*Trimean*	*Spread*
Dar es Salaam (capital)	14.4	16.1	17.9	19.9	21.8	17.9	2.9
urban areas	15.2	16.7	18.4	20.6	23.2	18.5	3.4
rural areas	15.0	16.5	18.3	20.3	22.6	18.3	3.2

Source: calculated from 1996 TDHS

4.4.3. Religion

Religion is believed to play a part in shaping the views, norms, belief attitudes and practises of the people. These will in turn govern the reproductive behaviour, and subsequently fertility. There are variations in values regarding marriage, marital dissolution and contraception among the different religions. The Table 33 show the age at first birth by religion.

Table 33: Mean age at first birth by religion

Religion	*T10*	*T25*	*T50*	*T75*	*T90*	*Trimean*	*Spread*
Moslem	14.5	16.3	18.0	19.9	22.0	18.0	3.1
Catholic	15.2	16.7	18.6	20.6	22.9	18.6	3.2
Protestant	15.2	16.8	18.4	20.4	22.9	18.5	3.2
None	14.7	16.2	18.0	20.1	23.2	18.1	3.5

Source: calculated from 1996 TDHS

From the Table 33 it is clear that religions seem to play a role in influencing the age at first birth however small. This is revealed by all the measures used, i.e. the trimean and all the percentiles, T10, T25, T50 and T75. Moslems show a lower mean age at first birth of 18 years than other religious affiliates. Although the Catholics and Protestants have different views regarding the use of contraception, Catholics seem to have higher mean age at first birth compared to Protestants. The Catholic Church does not approve of modern methods of contraception while the Protestant church is liberal on that issue. It is therefore expected that the Catholics should have a lower age at first birth. However, this is not the case in Tanzania where Catholics seem to have a higher mean age at first birth (18.6 years) compared to Protestants (18.5 years). It could therefore be interpreted to mean that the Catholics might be going against the view of their church as far as contraceptive use is concerned. As already mentioned, Moslems are known to marry earlier than Christians.

4.4.4. Education

Education, particularly women's education, has a significant interaction effect on fertility. It is believed that lower education leads to higher fertility, and likewise early fertility means lower education. With education, new values, aspirations, and a new outlook on life as well as skills for taking advantage of new opportunities come along. Advancement in women's education increases the potential for participation in a paid labour force in the modern sector of the economy. This in turn increases the opportunity cost of child bearing and creates trade-offs between child bearing and participation in the paid labour force. Education will keep women in the schools for longer years, thus delaying birth.

Table 34: Mean age at first birth by level of education

Education	*T10*	*T25*	*T50*	*T75*	*T90*	*Trimean*	*Spread*
None	14.2	15.8	17.6	19.9	22.8	18.5	3.6
Incomplete primary	14.3	15.9	17.6	19.5	21.5	18.2	3.0
Complete primary	16.0	17.2	18.7	20.5	22.5	19.3	2.7
Secondary +	15.9	18.1	20.2	23.0	25.7	21.1	3.8

Source: calculated from 1996 TDHS

Table 34 shows a clear relationship between the level of education and age at first birth. Those women with no education have a lower mean age at first birth compared to those with secondary and above level of education. This trend is revealed by all the percentile measures i.e. T10, T25, T50 and T75. The median age at first birth for women with no education is 17.6, while the median age for women with secondary level of education is 20.2 years. This finding supports the argument that education delays age at first birth. The reader may notice that the mean age at first birth for none and primary incomplete is at the same level. This is due to the fact that primary education in Tanzania lasts for seven years. The age to start primary school is 7 years, therefore most girls who complete primary education are 14 years old. At that age most have just attained age at menarche and few have not.

The trimean further reveals the differential in age at first birth by level of education. The mean age at first birth for women with no education is 18.5 years while that for women with secondary is 21.1 years. Women with secondary and above levels of education delay marriage as they stay for many years in schools compared with those with primary education. In Tanzania, once a girl completes primary education and fails to get a place in secondary school, she has no option but to remain in the rural area. The problem is that she has not acquired any skills that can enable her to get a job in the modern sector of the economy. This forces many of these girls into sexual relationship as a way of achieving economical security and social status for those who get married. By contrast urban primary school leavers have more opportunities to get a paid job in towns. Women who have secondary education will have higher chances of getting employment in the modern sector of the economy and will thus migrate to the urban areas. Furthermore, education modified women's values and aspirations in life so that they are more aware of the use of contraception to delay the first birth.

As can be observed from the table, the spread for women with no education and those with secondary level of education is wide, at 3.6 years and 3.8 years respectively. This suggests that births to women in these two educational categories have a wider distribution. On the other hand the spread for women with primary education is small, 2.7 years suggesting that the births of these women are concentrated within a narrow range. There is a difference of almost 3 years between those women with no education and those with secondary education (trimean), suggesting that secondary education on average will delay age at first birth by 3 years, while primary education will delay age at first birth for a year.

4.5. Demographic Implications of Age at First Birth

As we have already seen, age at first birth can be influenced by a number of socio-economic and behavioural factors. It is also likely that age at first birth can influence a number of demographic phenomena such as fertility, infant and child mortality, maternal mortality, and population growth.

4.5.1. Fertility

Fertility in Tanzania is in a transition of decline (Mturi and Hinde, 1995). Mturi and Hinde (1995) associated this decline with increasing age at marriage, which will in turn mean postponement of child bearing. But this argument was proved not to be true due to the prevalence of premarital births. However, the decline of fertility could have come about as a result of improvement in the status of women, and especially as far as women's education is concerned. In this section the mean number of children ever born will be used as a measure of fertility, and its relationship with age at first birth will be examined.

Table 35: Mean number of children ever born by age at first birth

Age at first birth	*MNCEB*	*N*	*Spread*
<15	5.9	421	2.9
15-17	4.6	1,905	2.9
18-19	3.8	1,794	2.7
20-21	3.5	1,062	2.5
22-24	3.5	625	2.3
25+	3.2	296	2.3
Total	**4.1**	**6,102**	**2.8**

Source: calculated from 1996 TDHS

It is evident from Table 35 that the mean number of children ever born decreases with increasing age at first birth. This is to be expected because all things being equal, women who start child bearing early are likely to have a longer period of exposure to the risk of pregnancy than those who start late. Having a longer reproductive span might result in more children. These results show that there exists a relationship between age at first birth and fertility. Further analysis on the relationship between age at first birth and fertility will be done using regression analysis in Chapter 5.

4.5.2. Infant and Child Mortality

Studies have shown that there is a relationship between age at first birth and infant and child mortality (Bicego and Boerma, 1993). Results of such studies indicate that the younger the age of the mother at the birth of the first child, the higher the chances of the child dying due to complications during childbirth. The factors that cause this effect in developing countries are not entirely understood. Some of the factors are known, such as economic hardships, malnutrition, poor medical care. However, to which extend these factors influence child mortality has to be studied yet. Certainly, there is a biological basis for the poor survival experience of first births as many first births take place before a woman has reached full physical and reproductive maturity, leading to increased perinatal risks and a more difficult delivery. Also a first time mother may be poorly prepared to handle new roles and responsibilities in her life with the baby. However, the degree of risk elevation associated with age at first motherhood varies with the level of access to, and use of, high quality antenatal and obstetrical services which are dependent on the level of community development, the economic situation of the household and the educational level of the mother. In this study infant and child mortality only will be considered for the first-born child.

Table 36: Childhood mortality rates (first born) by mother's age at birth; mortality rates (deaths per 1,000)

Age at first birth	*Neonatal*	*Post-neonatal*	*Infant mortality*	*Child mortality*	*Number of deaths*	*Number of births*
<15	42.8	73.7	116.5	35.7	65	421
15-17	40.9	40.9	81.9	21.0	205	1,905
18-19	38.5	43.5	81.9	16.2	179	1,794
20-21	26.4	30.1	56.5	11.3	73	1,062
22-24	40.0	28.8	68.8	8.0	51	625
25+	30.4	30.4	60.8	30.4	29	296
Total	**37.2**	**40.3**	**77.5**	**18.0**	**602**	**6,102**
0-4 years before TDHS[20]	31.7	55.7	87.5	53.7		

Source: calculated from 1996 TDHS

Table 36 shows an inverse relationship between age at first birth and under-five mortality. Neonatal mortality for first borns is 37.2 per 1,000 live first births, while neonatal mortality for all births was found to be 31.7. This means that there is excess neonatal mortality for first born. The average excess infant mortality associated with young age at birth (less than 15 years) is 39 deaths per 1,000 first births (from the average of 77.5 per 1,000 births) while women who had their first birth as adolescents have higher than average neonatal, postneonatal and infant mortality. Women who had their first birth after attaining age 20 have the correspondingly lower infant and child mortality than the average. A number of reasons could be attributed to this trend as explained earlier. Furthermore, in most cases women who start child bearing early do not seek medical attention especially for the first few pregnancies due to the shame of meeting older women in the antenatal clinics. As a result, such women face problems during childbirth, as there was no follow-up during the pregnancy. Coupled with this, their pelvis is not fully developed to accommodate the baby and it is thus likely that inflammatory diseases and other complications might develop leading to the death of the baby during or after childbirth.

Babies born to very young mothers are in most cases underweight, as the mother's nutrition and health were not catered for during the pregnancy. It is also possible that the baby does not have enough space due to underdeveloped reproductive organs of the

[20] Extracted from Table 67 of the 1996 TDHS report by the Bureau of Statistics, 1997 p. 98.

mother. Such babies once born are likely to die unless extra care and medical attention are provided.

4.5.3. Maternal Mortality and Morbidity

Maternal deaths are defined as any death that occurs during pregnancy, childbirth or within two months after the birth or termination of a pregnancy. Therefore, the maternal mortality rate is the annual number of maternal deaths per 1,000 women aged 15-49. However, most literature prefers to express these deaths as maternal mortality ratio which is expressed per 100,000 live births. The maternal mortality ratio (MMR) can be obtained by dividing the maternal mortality rate by general fertility rate for the same reference period. Although there are no accurate data of pregnancy related mortality and morbidity, a lot of the literature shows that complications associated with early childbirth (below age 20) are worse than for births in the older age groups (20-34 years).

In a developing country like Tanzania where medical conditions are inadequate, especially in the rural areas, and high incidence of infectious disease, and poverty are prevalent, the maternal mortality is expected to be high. From this fact it is expected that maternal mortality due to the first pregnancy or birth is much higher than in subsequent pregnancies.

The information collected in the TDHS does not allow us to investigate only deaths due to first pregnancy or first birth. This is due to a fact that the only information on maternal death is based on the list of all siblings given by respondents. Siblings means all the children born to the mother of a respondent starting with the first born and whether or not each of these siblings was still alive at the time of the 1996 survey. Age and the cause of death of sisters more than 12 years was collected. In this study we will assume that adolescent maternal death was due to first births complication. Table 37 indicates results of direct estimate of maternal mortality for a period of 10 years before the survey. It is estimated that 137 women died due to pregnancy related causes. The general fertility rate (GFR) is the number of live births per 1000 women. According to Table 37 maternal deaths accounted for 27 percent of all deaths to women aged 15-49, and maternal mortality ratio was found to be 511 deaths per 100,000 live births (This figure is reached by dividing maternal mortality rate by general fertility rate and

multiplying by 100,000). Adolescent maternal deaths account for 27 percent of all adolescent deaths in Tanzania. Hence the adolescent maternal mortality ratio is estimated to be 408 per 100,000 live births.

Table 37: Maternal mortality by age at death

Age	*Maternal deaths*	*Exposure*	*Mortality rates*	*Proportional of maternal deaths to female deaths*	*GFR*	*MMR*
15-19	17	30,867	0.551	.266	.135	408
20-24	38	30,743	1.236	.404	.260	475
25-29	31	26,243	1.181	.287	.255	463
30-34	20	20,220	0.989	.238	.217	456
35-39	18	13,980	1.288	.257	.167	771
40-44	6	8,239	0.728	.118	.087	837
45-49	8	4,356	1.837	.267	.042	4,373
15-49	**137**	**134,649**	**1.017**	**.274**	**.199**	**511**

Source: calculated from 1996 TDHS

4.5.4. Natural Increase

The age at which women begin to have children has a close relationship to the overall growth of the population. As most births take place at a very early age as seen in this study, it is an indication of higher fertility and subsequent rising population growth. The earlier the child bearing begins the greater the number of fertile years remaining, and the greater the likelihood of a big number of completed family size.

Age at first birth cannot be the sole factor in the natural increase of the country's population. There are other biosocial, economic and cultural factors at play. However, an increase in the average age at first birth both within and outside marriage, will in theory have a negative impact on the growth rate of the population. If age at first child bearing could be raised by increasing the contraceptive prevalence rate to delay or prevent premarital births, the improvement in lowering the population growth in Tanzania will be inevitable. This is due to the fact that for a broad based country like Tanzania late age at first birth means fewer women will have contributed for a longer duration to the natural increase. However it must be noted that late age at first birth on its own cannot reduce the fertility of a country, unless birth intervals is also checked by contraceptive use to avoid 'the compensation factor'.

4.6. Regression Analysis

The analysis carried out so far shows that there are major differences between certain subgroups of the population with respect to age at first birth. However, a bivariate analysis does not determine the extent to which these differences are directly related or associated with the particular variable concerned, and the extent to which they are the effects of other intervening variables. A useful technique for testing such effects is the use of multivariate analysis, which makes it possible to estimate the net effect of each variable when variation in the other selected factors are controlled. The independent variables interrelate with each other, and their interactions can alter the effects observed in bivariate analysis.

Age of the respondent at first birth as the dependent variable was treated as a continuous variable. The unit of analysis is a woman ever given birth. We did not consider age at first marriage as a background variable in this analysis because first birth may precede first marriage and vice versa. All the independent variables have been treated as dummy variables except current age. These include religion, education, and type of place of residence. For each of these background characteristics, one category has been selected as the reference category (RC) and is omitted from the equation. This is the one to which the regression coefficients are compared. Regression equation is as follows:

Age at first birth = f (age, age at first intercourse, education, literacy, religion, place of residence, childhood place of residence).

$$\text{Age at first birth} = \alpha + \sum_{i=1}^{k} {}_i x_i$$

is a constant and $_1 \ldots _k$ are unstandardised regression coefficients for each of the respective explanatory variables x_i.

Table 38: Regression results (unstandardised coefficients) of the relationship between age at first birth and selected variables

Variable	*Name*	*Dummy*	*Unst. coef.*	*Std. error*
Current Age	15-49	Cont.	0.047***	0.005
Age at first sexual intercourse	<15	RC		
	at union	I2	0.862***	0.130
	15-17	I4	0.812***	0.126
	18-19	I5	1.694***	0.153
	20-22	I6	3.093***	0.215
	22-24	I7	4.983***	0.345
	25 +	I8	7.348***	0.479
Education	None	RC		
	Primary incomplete	E2	-0.032	0.160
	Primary complete	E3	1.237***	0.186
	Secondary +	E4	1.880***	0.243
Literacy	Illiterate	RC		
	Semiliterate	L2	-0.206	0.173
	Literate	L3	-0.160	0.170
Religion	Catholic	RC		
	Moslem	R1	-0.353***	0.095
	Protestant	R3	0.011	0.107
Residence (combined)	Rural	RC		
	Urban	U1	-0.211*	0.101
Place of residence	Dar es Salaam	RC		
	Other urban	K2	0.531**	0.200
	Rural	K3	0.655***	0.181
Constant			15.016***	0.284

Adj. R^2 = 0.171, Durbin-Watson = 1.918

*** p<.001 (highly significant)

** p<.01 (significant)

* p<.05 (less significant)

p>.05 (insignificant)

Source: calculated from 1996 TDHS

Table 38 shows the regression results estimating the effect of background variables on age at first birth. All variables included in the multiple regression analysis explain 17 percent of the variability in age at first birth. It means therefore that the available background variables have not explained much of the variation in age at first birth but they play a significant role. The Durbin-Watson was 1.918 that means there is no auto-correlation between background variables in the regression analysis. The relationship between current age and age at first birth found earlier is confirmed in the regression analysis. Current age is found to be in a positive relationship with age at first birth. This relationship is statistically significant as can be observed from the table.

There is also a strong relationship between age at first intercourse and age at first birth. The result of regression indicates that if the age at first sexual intercourse increases, the age at first birth also rises. Women who start their sexual intercourse between age 15 to 17 have their first birth one year later than those who start before age 15. Those who had their first sexual intercourse after adolescence give first birth more than 3 years later than those who started having sex before the age of 15; the difference is statistically significant. It is interesting to note that if a woman has her first sexual intercourse when she is older than 24 years, her age at first birth rises to more than 7 years in comparison to those who start sexual intercourse before attaining age 15. Hence it seems that discouraging adolescents from sexual intercourse may raise age at first birth in Tanzania.

As can be observed in Table 38, age at first motherhood rises with the increase in the level of education. Primary education raises age at first motherhood by 1.2 years above those with no education; the difference is statistically significant. Women with secondary or higher education have the most significant increase in age at first birth as they delivered their first child on average 2 years later than those with no education. This confirms the hypothesis that education is positively related to age at first birth as women with higher education have a higher age at first birth. Incomplete primary education seems to be insignificant. This however can be explained by the fact that most of primary school dropouts engage in sexual activities earlier than their fellow pupils who remain at school. Pregnancy might be the main reason for dropping out.

The results of the regression analysis support the hypothesis that on average Christians give birth later than Moslems. Moslems tend to have their first birth 0.4 years before Catholics; the difference is statistically significant. These results may conflict with earlier findings that Catholics have higher fertility than other Christians. On the other hand it is possible that there is no relationship between age at first birth and lifetime fertility at all. This hypothesis will be examined in the following chapter.

The regression results show that urban women give first birth 0.2 years earlier than their rural counterparts; the difference is statistically significant. This is not an expected result since women in urban areas are more educated, more exposed to new ideas and life styles, and are thus more likely to be engaged in wage employment. Therefore they

are expected to start child bearing later. In addition, they are more likely to use modern methods of contraception. The modernising effects of urban areas could also change the values and attitudes as far as children are concerned. The high costs of living in urban areas could discourage women from having children.

In order to find out why the findings did not correspond to our expectations we subdivided the category 'urban residence' into the city of Dar es Salaam and other urban areas. It was interesting to note how the results changed after this modification. It seems that Dar es Salaam residents have lower age at first birth while other urban women gave the first birth 0.5 years later than Dar es Salaam women. Rural residents give first birth 0.7 years later than women living Dar es Salaam. Women living in rural areas in Tanzania give birth later than urban residents. The reasons why the relationship between age at first birth and type of residence are contrary to what we expected have to be further researched due to the fact that, this study is to a certain extend limited in its range of issues. Therefore, this topic has to be dealt with elsewhere.

4.7.Concluding remarks

The study has established that age at first sexual relationship, age at first marriage and contraceptive use are among the factors that influence age at which child bearing begins. In fulfilling the second objective which was to investigate the differentials in age at first birth with respect to background variables, the study has come up with the finding that education, place of residence, and religion play the greatest role in influencing age at first birth in Tanzania.

The study has revealed that the vast majority of Tanzanian women start child bearing at a relatively early age, 18.4 years on average but as early as 14.8 years for 10 percent of the women. According to the study, 50 percent of the women are mothers by the age of 18.2. Although the Tanzanian Demographic and Health survey data have revealed an increasing trend of age at first birth across cohorts, it is still relatively low by comparison with a number of developing countries although in line with other African countries South of Sahara. Illiterates and Moslems are found in this study to be more likely to start giving birth before 15 years of age. The striking results, which we cannot explain, were place of residence; it was found that rural residents have a higher mean

age at first birth than Dar es Salaam. Dar es Salaam has the lowest mean age at first birth.

Sexual activities among Tanzanian women start quite early. The mean age at first sexual relationship is 16.0 years with 10 percent of the women having the experience before age 14. By the age of 20, the majority of women (75.4 percent of all respondents) have had the first sexual experience. With the low level of contraceptive practice prevailing in the country (about 12.5 percent), low age at first sexual experience implies early child bearing. The data further reveal that on average the interval between first sexual intercourse and first birth is about 2.4 years in Tanzania. In sub-Sahara Africa, the interval between first sexual intercourse and first birth range from 2.3 years to 2.7 years with the exception of Zimbabwe with 1.2 years. Illiterates and Moslems residing in rural areas are more likely to experience sexual intercourse before age 15 than literate non-Moslem urban women.

Although age at first marriage in Tanzania is relatively low with a mean of 17.4 years, there seems to be an increasing trend in mean age at first marriage across the cohorts. With improvement in education, the younger cohorts stay longer in school and therefore delay marriage. The life table analysis used in this study shows that the interval between first marriage and first birth among women in Tanzania is very low, about 14.5 months on average. This therefore implies that there are no intentions to postpone the first birth after a woman has been married. About 25 percent of the women have the first birth within 9 months of marriage with the premarital births excluded from the analysis. This means illegitimacy conception is rampant in Tanzania as 25 percent of married women had their first pregnancy outside their marriage.

The rising trend in increasing age at first marriage could be attributed to several factors, namely the changing education policies that are geared towards boosting women's education. In addition, economic changes, which are reflected by rising standards of living, and stimulation of women's employment, are beginning to change people's attitudes toward early marriage. However, increasing age at first marriage implies an increase in premarital births, which is now common in Tanzania, (40 percent premarital conception among all first pregnancies which resulted in live births). The marriage act of 1971 specified the age at first marriage to be not less than 15 but there is a high

likelihood for an illiterate and Moslem rural resident woman to get married before attaining age 15, an indication that written laws and policies are not followed in Tanzania. Hence a new approach is necessary for the problem of premarital and early births as well as early marriages.

Incidence of primary sterility among Tanzanian women is low as only a small proportion of the women currently married for over 5 years are sterile. This low level of sterility could be attributed to improved nutrition and good medical care. However, the TDHS data could not clearly show the actual situation of sterility, as there were no probing questions on sterility in the questionnaire.

The multiple regression analysis used in the study reveals the existence of differentials in age at first birth associated with the age of a woman, age at first sexual intercourse, level of education, the type of place of residence, and religion (see discussion above). There are almost two years differences in age at first birth between those women with no education and those with secondary and above level of education. Catholics tend to give birth later and Moslems give birth earlier. But surprisingly, women in rural areas seem to have higher age at first birth than their counterparts in the urban areas even after separating Dar es Salaam City residents from urban residents. However, almost 70 percent of sampled women in Dar es Salaam were Moslems as well as almost 40 percent of other urban residents. In rural areas they amount to 27 percent of the total sampled women.

According to the TDHS data, there is a relationship between age at first birth and infant and child mortality. The results indicate that the younger the age of the mother at the birth of the first child, the higher the chances that the child dies due to complications during childbirth. Early age at first birth is always associated with prematurity accompanied by low birth weight that could result in the death of an infant. Maternal mortality and morbidity is also associated with the age of the mother at first birth. Child bearing which comes too early or too late is associated with a lot of complications during pregnancy and childbirth. Some of the complications are fatal and could lead to the death of the mother.

Early age at first birth is a factor associated with high fertility. This is because the earlier the age at first birth, the greater the number of fertile years the woman will

spend, and the greater the likelihood of higher total fertility which will have a positive effect on population growth. In the absence of active fertility control, the total number of children women bear throughout their reproductive period is largely a function of the age at which child bearing begins. Therefore, there is an inverse relationship between age at first birth and children ever born. This will be discussed in detail in the next chapter.

5. Fertility

5.1. Introduction

During the course of 1987, a milestone in human history was reached when the world population surpassed the five billion mark (five thousand million persons). The United Nations Population Fund (UNFPA) symbolically chose 11th July of each year to be commemorated as the 'Day of the Five Billion'. This figure has a special significance when one realises that after millennia of little growth, the world's population reached one billion around the beginning of the nineteenth century. It took about 160 years to increase to three billion and yet it has grown by an additional two billion since 1960 (UN, 1987). The sixth billion will be reached in June 1999 (PRB, 1998). Although the average annual rate of world population growth has been falling since 1965 from an historically unprecedented rate of 1.99 percent to 1.67 percent in 1985 and 1.4 percent in 1998, the absolute size of the annual increment to world population has been rising from around 63 million persons in 1965 to 77 million in 1985, further to 93 million in 1998, and is projected to reach a peak level of 1.9 billion in 2010 (PRB, 1998). This results from the built-in population momentum of each cohort of women in the child bearing age being larger than the previous one. Hence, the addition of the next billion to the world population is expected to take only 12 years, as compared to the 13 years it took for the population to increase from four to five billion, even though the growth rate during this period will be lower.

The key element behind this change in population, particularly in developing countries, is the level and pattern of fertility. Although mortality and migration also contribute to the size, structure and growth of population, and are hence important areas of study, population dynamics are strongly moulded by fertility. Fertility is also important because it is inextricably bound up with many aspects of the economic and social milieu. A better understanding of fertility behaviour may therefore yield insights relevant to a wide range of social and economic behaviour; patterns; and changes such as labour force participation, income distribution and educational aspirations for children.

Furthermore, an ability to estimate the magnitude of changes in fertility and the causes of those changes are required background information for the development of policy in many areas. For example, for the projection of expenditure on primary education, the analyst must know the number of children who may be enrolled in the future, and for this such projections, data concerning fertility and child survival are very important. Even more obvious, knowledge about fertility is necessary for the designing of policies so that they are likely to have direct or indirect effect on fertility and hence population growth. Within this context, planners and policy-makers may examine the probable impact of proposed policies and programmes directed towards other social or economic development objectives on fertility. Hence, it may be desirable to have an understanding of the linkages between fertility and socio-economic factors not only to enable the development of policies and programmes for achieving desired fertility goals, but also to contribute to the attainment of other development objectives through influencing patterns and levels of fertility.

Sources of such data include vital registrations, but in most of the developing countries vital registration systems are either incomplete or non-existing. In Tanzania vital registration somehow exist in Dar es Salaam and a few regional headquarters. The exercise of vital registration is a responsibility of the Attorney General's office. But the collection of these data does not give room for any scientific study as they are always incomplete. For this reason, determining the current level of fertility in the absence of vital data is a big challenge. In this situation, the only reliable sources of vital rates are censuses and surveys. But direct estimations of crude birth rates and age specific rates from censuses and survey data in developing countries, have a lot of errors due to poor quality. This handicap called for many scholars to try and fill this gap of knowledge by developing different techniques of estimating levels of fertility and mortality, popularly known as indirect techniques.

In this chapter, attempt is made to examine the fertility levels, differentials, determinants, and trends in Tanzania. Indirect estimates of fertility are obtained from the three post-independence population censuses of Tanzania (1967, 1978 and 1988). These estimates give the national trends in fertility for the period 1967-1988. Methodology of analysis will be fully discussed to give a reader an overview of indirect techniques. This chapter also tries to study fertility trends by using the 1991/92 and

1996 Tanzania Demographic and Health Survey (TDHS) data. The second task in this chapter is to examine the determinants of fertility in Tanzania. The Bongaarts model is used to investigate the proximate determinants of fertility by using the two TDHSs. Finally, the socio-demographic determinants of cumulative fertility are analysed using bivariate and multiple regression analysis.

5.2. Population Census Estimates

In all three post-independence population censuses two types of data were obtained on which fertility estimations are based. First, women were asked questions regarding the number of children they had ever born. Second, women were asked how many children they had born in the twelve months prior to the census. The answers to the first set of questions give information on lifetime fertility, and those to the second set help us to determine current fertility.

Census data from developing nations as already mentioned earlier, suffer from some limitations. These limitations can be explained as those affecting current fertility data, age specific parity data, and maternity history data. Errors that affect current fertility data include age misreporting, omission of births, reference period error, and the use of short time period, which raise uncertainty in the reported fertility levels due to sampling variability of the observed number of births.

Age specific parity data on the other hand can be affected by misclassification errors arising from misreporting of age and/or duration of marriage, errors in the reported number of births (numerator) and women of specific age group (denominator). The most serious error in the reported births is the omission of births by older women, especially of those births that ended in the early death of the child. Older women also tend to forget grown-up children, those born to another husband or man, and children not present at home for various reasons. There are also factors that may tend to inflate the number of births, for example the inclusion of step or adopted children or grandchildren, the inclusion of births, and non-inclusion of parity of a sizeable proportion of women who did not state their parities, or a dash or a space left blank (UN, 1983).

For maternity history data, possible sources of variation other than cohort or period changes are misstatement of the age of women especially in their earlier lifetime fertility data, under-reporting of births of women above 35 years and unmarried adolescents who would not like to be reported as mothers. Those women, who died before the interviews were conducted, might have had a different fertility pattern from those interviewed. Given the possibilities of these distortions, caution needs to be taken in interpreting the reported data. In this situation, indirect techniques cannot be avoided.

The usual method of adjusting the ASFRs is to adopt one of a number of strategies that use the P/F ratio first proposed by Brass (1964). This is the ratio between the reported number of children ever born by women at a particular age (P_i) and the sum of the ASFRs to that age (F_i). In situations where there has been no decline in fertility this ratio should be around one. However, this is not the case due to the fact that F is affected by under-reporting of births 12 months prior to the census (assumed to be constant at all ages), and P is affected by omission of children, particularly by older women. The latter error is overcome by adjusting the ASFRs by the P/F ratio for women aged 20-29, since these women are believed to report their number of children ever born most accurately. This estimation procedure is based on the assumption that fertility levels and patterns have not changed markedly in the recent past.

5.2.1. Crude Birth Rate

The crude birth rate (CBR) is normally the first step to estimate the fertility of a nation. It is defined as the ratio of the total births in a population for a specified period to the total number of person-years lived by the population during that period, with the assumption that the population is closed to migration and experiencing constant age specific fertility and mortality rates eventually attaining a constant age distribution given by:

$$C_a = b * e^{-ar} * P_a \qquad (5.1)$$

Where C_a = Proportion of population under age a

b = Birth rate

r = Intercensal growth rate

P_a = Probability of surviving from birth to age a

Such a population is known as a stable population. But when mortality gradually declines without any change in fertility, the population loses its stability and become what is known as a 'quasi-stable' population. The age distribution of the quasi-stable population is close to the age distribution of the stable population that has the same level of fertility and current mortality. A number of scholars have suggested corrections of birth rates derived from the stable population to accommodate the decline of mortality (UN, 1967; Zachariah, 1970; Abou-Gamrah, 1976). But these methods are not easy to use, as they require the knowledge of the time mortality started to decline and the magnitude of decline. Therefore it is not easy to determine the time in which mortality in Tanzania started to decline as we have so far only three reliable censuses. In this study therefore, the robust estimate of birth rate developed by Coale (1981) and simplified by Venkatacharya and Teklu (1987) will be employed but only with the assumption that it is reliable with regard to the Tanzanian context.

One advantage of using the Coale's robust method is that the cumulated age distribution is used to reduce the errors of age misstatement within the age range considered. In countries like Tanzania where one does not have a firm knowledge of the pattern of mortality, the birth rate estimates which use only rate of growth of population (r), proportion of children of both sexes under 15 years C (15-), and the probability of surviving from birth to age 5 (l_5) can be used irrespective of the true mortality pattern of the study population without any serious error in the estimation value (Venkatacharya and Teklu, 1987).

The work of Coale, Venkatacharya and Teklu indicated the survival of the population of both sexes under age 15, using the life table corresponding to the Brass type of indirect estimate l_5 , gave robust estimate of birth rate in the form:

$$b_r = \frac{C(15-)e^{7.5r}}{15Lo} \qquad (5.2)$$

Where b_r is the birth rate

C(15–) = proportion of children of both sexes under 15 years.

r = rate of population growth.

7.5 = period prior to the second enumeration.

15Lo = survivorship from birth to age 15.

By using the relationship between l_5 and 15Lo Venkatacharya and Teklu (1987) found that:

15Lo was equal to U + V(l_5) where U and V are constants obtained by fitting a straight line for various model life table families. The crude birth rate obtained by using this relationship is assumed to be close to reality since the population under 15 is cumulated. Therefore, error of omission in age below five years and age heaping between age 5-9 as well as shift from age 10-14 is reduced.

The values of U and V are tabulated and presented in Venkatacharya and Teklu (1991:47). Egero and Henin (1973) found that the north family life table was suitable for Tanzania. The values of U and V as given by Venkatacharya and Teklu (1991:47) are 0.161 and 14.789 respectively. By substituting these values in our formulae 5.2 we obtain:

$$b_r = \frac{C(15-)e^{7.5r}}{.161 + 14.789 l_5} \qquad 5.3$$

Table 39: Input and estimated crude birth rate by using formulae 5.3

Census year	*1967*	*1978*	*1988*
Growth rate (r) in percentage	3.1	3.2	2.8
l_5	.741	.769	.808
C (15-)	.439	.461	.457
CBR per 1,000	50	51	47

Source: 1967, 1978, and 1988 Censuses

Table 39 shows that crude birth rates in Tanzania have been very high, reaching almost 50 per 1,000. But in the 1980s, they seem to have declined by 3 per 1,000. This figure

suggests that fertility in Tanzania has just started to decline. Hence, more effort should be encouraged to reduce fertility. On the other hand, this decline can be attributed to the quality of data. It seems that earlier censuses had a higher incidence of misreporting errors whereas the 1988 census was of better quality.

The crude birth rate is a crude measure of fertility because the denominator contains a large population not exposed to child bearing, i.e. men, children and elderly persons. It also includes sexually inactive and non-fecund women of child bearing age. Despite this shortcoming, the measure is highly useful in measuring short run changes in fertility within a particular country. This measure is less useful in comparing the fertility of two countries because of differences in age structure (Ngalinda, 1991). Another shortcoming of CBR is that it is not very sensitive to small fertility changes as it tends to minimize them. For example if the birth rate rises, there is an increase of children in the population. This swells the size of the denominator and tends to understate the fertility increase. Therefore, CBR tend to understate the extent of a genuine fall in fertility. Besides those shortcomings, the crude birth rate is an exact measure of the impact of fertility upon population growth at a particular period. Demographers on the other hand, are interested in obtaining crude birth rate as it is one of the inputs in estimation of natural increase of any nation because crude birth rate combined with the crude death rate signals the rate of natural increase.

5.2.2. The Completed Family Size

The Completed family size represents the cumulated fertility of specific women for each successive age and involves only the variability of age (Kpedekpo, 1982). The completed family size is defined as the number of children ever born by the end of the reproductive period of a woman's life. This exhibits much more stability than do age-specific fertility rates from year to year. This is important for demographic analysis as the exercise involves following-up a group of women born in a particular year for their entire reproductive life by recording the number of children they bear. Due to time and financial constraints in developing countries, the exercise is not widely used, instead the average parity of women aged 45-49 (P7) is taken to represent the completed family size with the assumption that fertility of older cohorts are equal to the current fertility

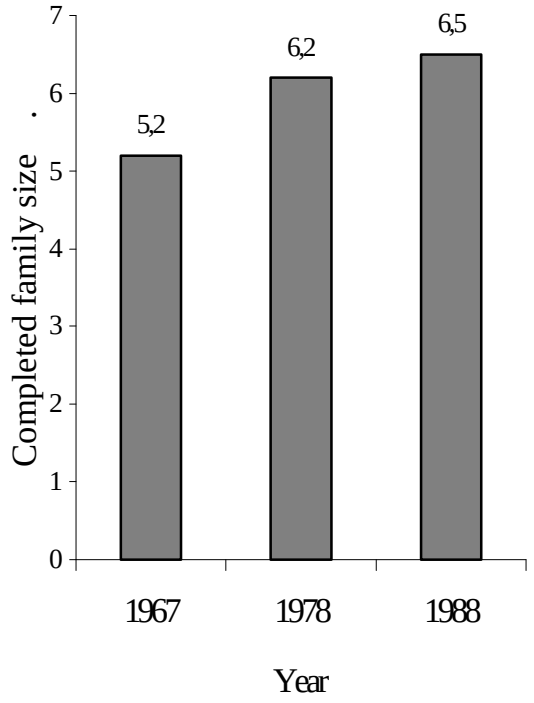
experience of women in child bearing ages. If the value of P6 is greater than P7, P6 is taken to represent the Completed family size.

Table 40: Mean number of children ever born

Age Group	*Pi*	*1967*	*1978*	*1988*	*1991/92*	*1996*
15-19	1	.527	.437	.313	0.269	0.235
20-24	2	1.978	2.048	1.553	1.424	1.335
25-29	3	3.181	3.664	3.154	2.919	2.804
30-34	4	4.160	5.111	4.764	4.434	4.215
35-39	5	4.778	5.933	5.846	5.831	5.460
40-44	6	5.017	6.209	6.396	6.900	6.698
45-49	7	5.204	6.081	6.474	6.941	7.285

Source: calculated from 1967, 1978, and 1988 Censuses; 1991/92 and 1996 TDHS

Figure 17: Completed family size in Tanzania



Source: calculated from 1967, 1978, and 1988 Census

Figure 17 suggests that fertility in Tanzania has been increasing from the observed Completed family size. But perhaps the figure of 1978 does not give a true picture as we took P6 instead of P7. Choosing P6 is due to the fact that the value of P6 is smaller than P7 an indication that the mean parity of ages 45-49 is more affected by omission and age misreporting. We assume the age group 45-49 for 1988 has fewer omissions as these are cohorts that had most of their child bearing period in the post-independence

era or modern times compared to earlier censuses. However, mortality of women also affects the measure since not all women reach age 45-49. Women mortality inflates fertility because those who died at a younger age on average might have had fewer children (different fertility behaviours). However for a constant fertility population, this methodology has one serious shortcoming as the completed family size might not be identical with total fertility rate.

5.2.3. Fertility Patterns

The reproductive period of a woman is usually considered to extend over a span of 35 years, from about 15 to 50. Ideally natural fertility could have an upper limit of as many as 35 births per woman. This means that a woman gives birth during the 35 years (15-49) of her life at 12 months interval between two successive births (Bongaarts and Potter, 1983). The upper-limit model assumes 9 months of full pregnancy and about 3 months after the birth of each child during which a woman cannot become pregnant. In reality, it has been estimated that natural fertility can reach around 15 births per woman if the fertility inhibiting effects of delayed sexual unions, sexual interruption (abstinence, coitus interuptus etc), and breastfeeding are removed (Bongaarts, 1978).

In an ideal situation, all women are expected to be fertile during their whole reproductive period. But a small proportion of women may be sterile throughout the entire span, and most women or their partners may be sterile during some part of the reproductive age span. The proportions of women who are sterile at different ages are unknown. But this could be shown by an age specific fertility schedule of a country in the absence of contraception. Generally, a hypothetical model of age specific fertility curve shows a general low rate at 15 and then rises reaching a maximum at ages between 20 to 29, sometimes between 25 and 34. Then there is a decline, at first a gradual, and then a steep one at older ages until it reaches the lowest level at age 50.

The analysis of the shape of the age specific fertility schedule is an interesting and important part of the study of fertility. This is due to the fact that the mean age at child bearing, which is closely related to the mean of this schedule, is important in the relation between total fertility rate and population growth. The shape of the age specific fertility curve is also the link between the total fertility rate and such variables as the age

at first birth and the age at menopause. For example a decrease in the age at first birth will affect the early part of the age specific fertility schedule and it will affect the total fertility rate through this part of the curve.

Another importance for the study of age patterns of fertility, is the implication it has on policy formulation. For example, two countries with the same gross reproduction rate (GRR) but different mean ages of fertility schedule would produce different annual crude birth rates.[21] Therefore the age patterns of fertility have a bearing on the natural growth rate. Hence in order to reduce the natural growth rate, one policy measure in a country like Tanzania would be to raise the age at first birth in order to reduce fertility rate at young ages. Considering the broad-based age structure of these populations, such policy is likely to reduce the number of infants that would have been born and consequently reduces the crude birth rate. However during the transition period, if the average span between the generations is growing, then the population growth decreases even at constant fertility levels.

Table 41: Reported ASFR Tanzania

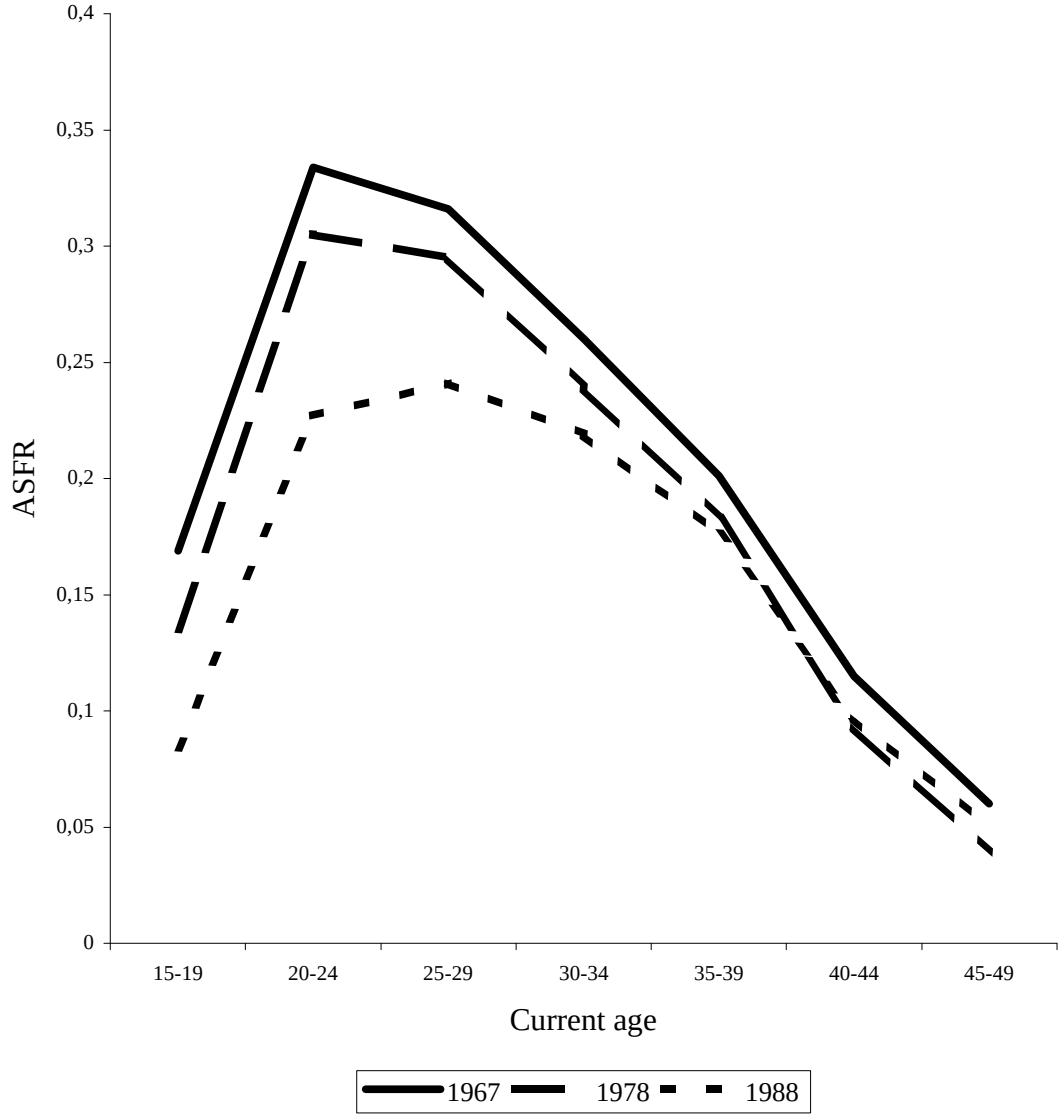
Age	*1967*	*1978*	*1988*	*1991/92*	*1996*
15-19	.169	.135	.084	.144	.135
20-24	.334	.305	.227	.282	.260
25-29	.316	.295	.241	.27	.255
30-34	.260	.239	.219	.231	.217
35-39	.201	.183	.176	.177	.167
40-44	.115	.093	.097	.108	.087
45-49	.060	.039	.050	.037	.042
15-49	**3422**	**3267**	**1.097**	**1.249**	**1.163**
5 x (15-49)	7.275	6.445	5.485	6.245	5.815

Sources: For 1967: Bureau of Statistics, 1973.
For 1978: Bureau of Statistics, 1983.
For 1988: Bureau of Statistics, 1994.
Otherwise the data are calculated from the TDHSs.

[21] The GRR is a fertility measure related to TFR. This measure is identical to TFR except that it refers to female births only. It can simply be obtained by multiplying the TFR by the proportion of all female births in a year. This indicates how many daughters a woman will have in her lifetime. With that in mind, we can equate TFR to GRR. Then for two populations with the same fertility level but different mean age at fertility will have different CBR and hence different population growth. For a policy formulation, the level of fertility may not necessarily be compared to minimum age at birth called fertility schedule.

Figure 18 shows the pattern of fertility by ages as reported by respondents aged 15-49 years in each census. The shape of the curves looks similar to those observed in other less developed countries. That is, the ASFR increases from early ages of child bearing (15-19 years) and reaches its maximum value in the age group 20-29 years. It then declines steadily to the end of the child bearing ages (45-49 years). The curves for the 1967 and 1978 censuses look similar, having a sharp peak at age group 20-24 whereas the 1988 census data has a peak for women aged 25-29. This implies a change in the age-specific fertility pattern. Another observation from the curves is that the ASFRs are consistently higher for the 1967 census compared with the 1978 and 1988 censuses. Whilst the 1978 census gives higher ASFRs for younger women than that in 1988, the opposite is true for older women (aged 40 years or above). It could be concluded from this that recently women have tended to bear more children at an old age than previously. However, it could also be argued that the observed pattern is due to better reporting of live births by old women in the 1988 census compared with the 1978 census. In summary, the age pattern of fertility observed in Figure 19 suggests a decline in fertility for women less than 40 years particularly for the period 1978-88.

Figure 18: Patterns of fertility in Tanzania



Source: calculated from 1967, 1978, and 1988 Census

The age specific fertility distribution can be classified into three broad group (UN, 1963).

i) Early peak type (maximum fertility in the age group 20-24)

ii) Late peak type (maximum fertility in the age group 25-29)

iii) Broad peak type ((i) and ii) differs only slightly).

From this categorisation, the shape of the fertility curve of the 1988 census suggests a broad peak in recent years for Tanzania compared with earlier censuses. The easy way to crosscheck this finding is to examine mean age at first birth. In censuses however, it is not easy to investigate age at first birth, as there is no birth history but only the

number of children ever born. In a situation like that, we can simply assume mean age of fertility schedule to represent the average age at first birth.

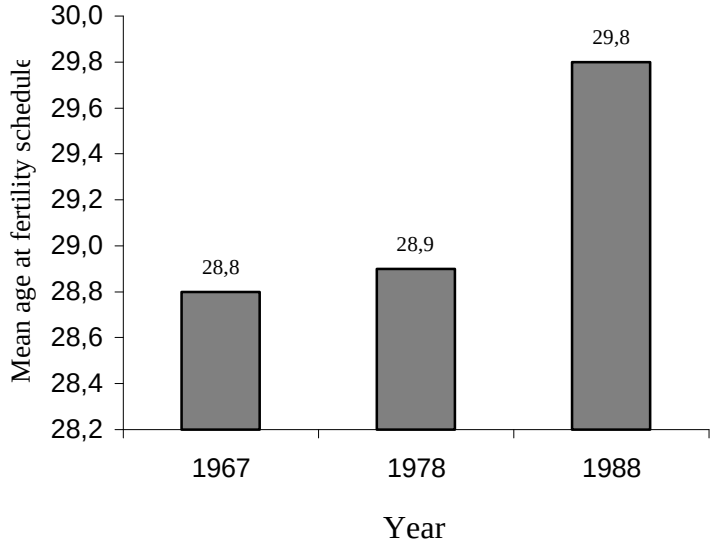
The mean age of fertility schedule can be calculated from tabulated responses to a question about births occurring in the preceding year, with due allowance for the fact that women who report a birth during the preceding year would on average have been 15[22] months younger at the time of birth than at the time of census. Mean age at fertility schedule is defined as

$$m = \frac{\sum_{i=1}^{7} f_i * x_i}{\sum_{i=1}^{7} f_i}$$

Where m is the mean age at fertility schedule, f_i is the age specific fertility rate in an i^{th} age group (i.e. for age group 15-19, i is 1 and for the age group 45-49, i equals 7), and x_i is the mean age interval of the i^{th} age group (i.e. for the age group 15-19 x_i is 17, and 47 for age group 45-49). Table 42 shows the result of mean age fertility schedule by using this formula.

22 Six months younger plus 9 months (from January to 28.08 the Tanzania census day).

Figure 19: Mean age at fertility schedule



Source: calculated from Population Censuses of 1967, 1978, and 1988

Figure 19 shows that, the mean fertility schedule has been rising from 28.8 years in 1967 to 29.8 years in 1988, however this observed mean age at fertility schedule contradicts the finding of age specific pattern we observed above, that the earlier censuses prior to 1988 shows an early peak, while the 1998 indicate a shift from early child bearing to broad peak where child bearing is mostly spread between age 20 to 29. The observed mean age at fertility schedule signals the decline of fertility between 1978 to 1988, although there was a steady level of fertility between 1967 to 1978 so that the difference between these two mean age at fertility schedule is negligible.

To control the observed mean age of fertility schedule so that it will not suffer from the effect of age mis-statement errors, we will compare Table 42 results with computed mean based on a model schedule. One such a schedule is the one suggested by Coale and Demeny (UN, 1967) who studied the relationships governing the mean age at child bearing and the mean parity (P_i) at ages 20-24 and ages 25-29, P_2 and P_3 respectively. They found that the ratio P_3/P_2 in a population not practising birth control, depends primarily on the ages at which women begin their child bearing. A high value of P_3/P_2 indicates a late start and a low value indicates early start.

In this model the assumption is that the decline of fertility with age in a population not practising birth control follows a fairly common pattern, so that primarily the rising portions determine the mean age of the fertility schedule (m). Coale and Demeny found

that the relationship between m and P_3/P_2 follows a linear curve of the form of:

$$m = a + b\left(\frac{P_3}{P_2}\right) \quad (5.5)$$

Where α is the y-intercept and β is the gradient of the graph in normal notations.

Based on empirical data, the values of α and β were determined by least square estimates and found to be $\alpha = 23.28$ and $\beta = 2.25$ respectively. Then the equation becomes:

$$m = 23.28 + 2.25\left(\frac{P_3}{P_2}\right) \quad (5.6)$$

By using formulae 5.6 the calculated mean age at child bearing is tabulated below:

Table 42: Mean age of distribution of fertility

Census Year	*1967*	*1978*	*1988*
Mean (m) (observed)	28.8	28.9	29.8
Mean age at child bearing by using the parity approach	26.0	27.3	27.8

Source: calculated from 1967, 1978, and 1988 Censuses

After controlling the observed mean age of fertility schedule to save it from the effect of age mis-statement errors by using the parity approach, we did not find a shift in peak, rather the data suggest that Tanzanian fertility can be categorised as a broad peak from 1967 to 1988. This calls for more indirect techniques to confirm if there is any shift between censuses.

5.2.4. Level of Fertility

In this study we will use the total fertility rate (TFR), defined as the number of children a woman would have by the end of her child bearing years if she were to pass through those years bearing children at the observed age-specific fertility rates. This measure has an advantage that it is not affected by the age structure of the population like CBR. In calculating Completed family size we took the average parity of age group 45-49 to represent fertility level of a population. But average parities calculated from data on children ever born to a total number of women in the age group, can be distorted either by errors in reporting children ever born or errors of misplacing women out of their age group. Considering this shortcoming, the work of Brass and Coale and Demeny tried to minimize these distortions (Brass, 1980).

5.2.4.1. Parity Ratio Methods of Estimating Fertility

Coale and Demeny demonstrated that period TFR could be approximated as:

$$TFR = \frac{P_3^2}{P_2}$$

Where P_2 = MNCEB by women aged 20-24

P_3 = MNCEB by women aged 25-29.

The relationship is an empirical relationship rather than a theoretical relationship. It depends on the following assumptions:

i) P_2 and P_3 are not affected by the reference period of misplacement errors and are least biased for omission.

ii) The parities are based on women in the younger ages when reporting is assumed to be more accurate.

iii) Fertility for the ages 15-29 has remained constant in the recent and past.

This implies that the deviations from these basic assumptions are likely to result in a biased estimate of TFR.

In a similar way Brass (1980) developed a short cut method of estimating fertility from mean parity by age under the following assumptions:

i) The pattern of fertility follows the Gompertz curve.

ii) The quality of the reported mean number of children ever born extends to age group 30-34. Then by using the second, third and fourth mean parities, he found that:

$$TFR = P_2\left(\frac{P_4}{P_3}\right)^4$$ where P_2, P_3, and P_4 are defined above.

He stressed that this method will give a better estimation than the Coale and Demeny method if ages and births extending to age 35 are reported accurately.

As a check for the choice of the formula to be employed, he suggested that the following conditions must be met:

1. If $\frac{P_3^2}{P_2} < P_2\left(\frac{P_4}{P_3}\right)^4$ then the Gompertz model does not give a good fit for the reported mean parities of cohorts. In that case he recommends the use of $\frac{P_3^2}{P_2}$.
2. If $\frac{P_3^2}{P_2} > P_2\left(\frac{P_4}{P_3}\right)^4$ then the Brass formula is likely to give better estimates (Brass, 1980). Therefore he recommend the use of $P_2\left(\frac{P_4}{P_3}\right)^4$.
3. Again, if the estimates are less than P_6 and P_7 there is an indication that the underlying assumptions are not met. Then the formula should not be used.

Let us examine Table 43 in relation to the conditions mentioned above. Condition three is not met for two years, as Completed family sizes are greater than all estimates for 1967 and 1988 censuses. The choice of TFR 6.6 in 1978 can be plausible.

5.2.4.2. P/F Ratio Methods of Estimating Fertility

Brass (1967) developed a useful formula of comparing lifetime fertility to cumulative current fertility and the ratio of the two under the following assumptions:

i) Fertility for the population under study remained constant for sometime in the past.

ii) The reported number of children ever born to women in their early ages, say 15-35 is more or less accurately reported.

iii) The reported number of births for the previous year may suffer from errors resulting from inaccurate perception by the respondents of the reference period, but these errors are invariant with age.

5.2.4.2.1. Brass P/F Ratio Method

In the P/F ratio analysis Brass (1967) recommended P_2/F_2. His assumption was that women in the age group 20-24 remember the number of children born by them sufficiently accurately because such women will have only a small number of births that could have occurred in recent years thereby reducing recall error. But some of these women could have entered into reproductive life in recent years. This can lead to a false conclusion that fertility has been on decline in the years proceeding the enumeration date. Also the cumulative fertility F_2 which is based on women in the age group 15-25 is assumed to have misstatement errors that will have no effect on the age structure of the current fertility schedule, but that is not the case. In order to minimize these and other shortcomings, other scholars have tried to use the average of various combinations (Somoza, 1981). These adjustment factors are shown in Table 43.

In all cases the $\frac{1}{3}$ $(P_2/F_2 + P_3/F_3 + P_4/F_4)$ adjustment factor is somehow more plausible. But in lieu of problems of assumptions and quality of data, other methods for estimating fertility should be taken into considerations.

5.2.4.2.2. Brass Relational Gompertz Model (BRGM)

Brass modified his traditional P/F method through the intermediary of relational Gompertz model that has some modest but useful advantages. According to Brass, the simplest specific use of the model is the estimation of fertility from the mean parities reported at a census or any enquiry, provided the level of fertility can be assumed to have remained relationally constant and parities are also the current synthetic cohort values. However, experience has shown that the parities for the older women are too low because of the omission of births and possibly selection factors. The whole idea therefore was to get a model that can fit the mean parities of the younger women.

The Gompertz function can also be estimated by fitting the model to cumulated age specific fertility rates of younger women such as ages 15-19, 20-24 and 25-29. In short, the function is

$F(x) = A^{b^x}$

Where F(x) is the cumulative fertility by age x. A and b are constants related to F, which is the Total Fertility Rate by the end of reproductive life.

The above equation can be reduced to a linear function.

$$Y(x) = -\ln(-\ln\left(\frac{F(x)}{F}\right))$$

In the transformation, Y(x) values of various populations are related to one another. One population therefore can be chosen as a standard for comparison with others. Booth (1979) developed a standard model based on the Coale and Trussell model of fertility $_s$(x), hence:

Y(x) = + $_s$(x) Where and are constants reflecting the pattern of fertility. The model also holds if F(x) is replaced by mean parity Pi.

Zaba (1981) showed that the series of partial fertility ratios F(x)/F(x+5) or P_i/P_{i+1} can also be represented linearly in the form:

$$Z(i) = -\ln(-\ln\left(\frac{P_i}{P_{i+1}}\right)) \qquad i=1,2,...,7$$

$$Z(i) = -\ln(-\ln\left\{\frac{F(x)}{F(x+5)}\right\}) \quad x = 20,..., 50$$

The estimates of and are obtained by fitting the approximately equivalent relations:

$Z(i) - e_i =$ + g $_i$

$X(x)-e_x =$ + g $_x$

The values of e_i, e_x, g_i, and g_x are tabulated for reference in Brass (1981).

5.2.4.2.3. Arriaga's Approach

Arriaga (1983) also modified the P/F approach by extending it to a case of changing fertility rather than transforming the recorded age specific fertility figures to children ever born type figures. The difference between this approach and others is that the usual P/F ratio methods transform the current data into an equivalent measure of lifetime fertility. But Arriaga's method transforms the data on children ever born into estimates of age specific fertility rates consistent with mean parities. Steps are as follows:

1. For a given Pi, age specific fertility rates (ASFR) consistent with the mean parity are generated.
2. ASFR are cumulated and compared with the reported cumulated ASFR.
3. For these two sets of ASFR, the adjustment factors are then derived from the ratio of these two cumulated ASFR.

The UN software Mort pak-Lite is used to generate ASFR in this study.

5.2.5. Summary of Census Fertility level Estimates

Table 43 shows a summary of the estimates for all three censuses, which present the fertility rate estimated by using a range of different methods, together with a final 'best' estimate.

Table 43: Summary of fertility estimates by using various methods

S/N	*Technique (method)*	*1967*	*1978*	*1988*
1	Observed/Reported[23]	7.3	6.5	5.5
2	Official documented	6.6	6.9	6.5
3	Completed family size	5.2	6.2	6.5
4	Coale and Demeny $(P_3)^2/P_2$	5.1	6.6	6.4
5	Brass modified Coale and Demeny's formulae $P_2(P_4/P_3)^4$	5.8	7.7	8.1
	P/F Ratio Methods:			
6	P_2/F_2 adjustment factor	7.8	8.3	7.9
7	½(P2/F2 + P3/F3)adjustment factor	7.2	8.0	7.8
8	1/3 $(P_2/F_2 + P_3/F_3 + P_4/F_4)$ adjustment factor	6.9	7.8	7.7
	Brass Relational Gompertz Model			
9	fitted to current data base on 15-19	7.8	6.5	4.7
10	fitted to current data base on 20-24	7.4	7.7	5.8
11	fitted to current data base on 25-29	6.5	7.5	6.4
12	fitted to current data base on 30-34	6.0	7.4	6.9
	Arriaga's Approaches based on adjustment factor:			
13	20-25	7.1 (6.9)	7.8 (7.9)	7.6 (6.7)
14	25-30	6.8	7.8	7.6
15	20-30	6.9	7.8	7.6
	Range	5.1-7.8	6.2-8.3	4.7-7.8
	Plausible	**6.9**	**7.4**	**6.5**

Source: calculated from 1967, 1978 and 1988 Tanzania Population Censuses data

The reported national annual TFR for 1967 using children ever born for women age 40+ was 7.3 and the Completed family size is far below the observed TFR. We have seen above that the two parity relationships cannot be used here as conditions are not satisfied. But the use of P/F ratio to adjust for under-reporting of births of older women inflates the fertility level further to a TFR of 7.8 (Table 43). Egero and Henin (1973) argue that births in the period 12 months prior to the census might have been over-reported due to a problem with the references period. It could be possible that women reported their births since 7 July 1966 instead of 28 August 1966 because enumerators were told to ask people to recall their live births since one and a half months after Saba-

[23] Observed or reported TFR means the calculated TFR by using direct methods. The official documented TFR is that rate which is given by the Bureau of Census as a final estimate. One must use several indirect techniques to get a plausible estimate as there is no specific indirect method to use in estimation of TFR so far.

Saba[24] day in 1966. However, there is also the possibility that children were omitted due to the way the question was framed. In the Kiswahili questionnaire the question read: '*Una watoto wangapi?'* which could mean present children excluding those dead and living elsewhere. Moreover, women aged 12 years and above were asked a single question on the number of children they had ever had. It has been argued that a single question on the number of children ever born increases the number of omitted births particularly among older women who are likely to omit children not living at home or those who died a long time ago (United Nations, 1983). This argument is supported by the relatively small value of average children ever born for women in age group 45-49 (P7) given in Table 40.

The official estimate given by Egero and Henin for the 1967 census was obtained by computing TFR based on the 'child-women' ratio method. The estimated national TFR was 6.6 (Egero and Henin, 1973). Whilst the possibility of over-reporting due to misunderstanding of the reference period cannot be ruled out, this estimate places the official figure lower than the reported TFR (0.7 births per women). This value of TFR seems implausibly low. Egero and Henin did not take into consideration other problems that are believed to cause under-reporting of births 12 months prior to the census. For instance, in addition to the fact that only a single question was used, people, particularly in Africa, are usually reluctant to talk about recently dead children, especially those who died in infancy. This can deflate the number of recent births. It can therefore be argued that the reporting of births during the 1967 census was probably subject to errors in both directions (those that inflate and those that deflate the number of births).

The three combination average of the Brass P/F ratio shows somehow a plausible figure. The Brass Relational Gompertz Model, fitted with ages below 25, gives a higher figure than reported while that fitted with ages between 25 to 35 gives lower figures. Arriaga's approaches show an average of 6.9 too. Therefore, it seems that many methodologies shown in Table 43 give an adjusted TFR of 6.9 which is argued to be more plausible for Tanzania in 1967 than the official estimate of 6.6 children per woman.

[24] Saba-Saba day (7 July) refers to the day TANU, by then the ruling and the only political party, was established. This day used to be very special and was celebrated nation-wide every year. Hence, it was easier for a person to remember this event than 28 August.

The data collection process was modified for the 1978 census so as to avoid the problems faced in the 1967 census. The first modification was to ask three questions on children ever born instead of just one. Women were asked to report the number of their own children still living with them, the number living elsewhere and the number who had died. The total number of children ever born was obtained by adding the three numbers reported. This method is known to minimise the problem of omission of births (United Nations, 1983). However in Table 43 above, P6 is greater than P7, which suggest that a significant number of births to older women are omitted.

Several other procedures were also used to estimate the TFR using the 1978 census data as explained above. TFR based on parities at various ages can be calculated using the Coale-Demeny method and the Brass method as the above conditions are satisfied. But for the 1978 data, we can take into consideration the Coale-Demeny method since it is the one which satisfies all conditions explained earlier, giving a figure of 6.6 (Table 43). This figure however seem to be at the lower side due to the period in discussion. The value obtained by Brass Relational Gompertz Model based on ages 30-34 seems to give a plausible estimate of 7.4 for the 1978 population census.

The computational procedure followed to obtain TFR during the workshop on the initial analysis of the 1988 census data (Chuwa et al., 1991) put the official figure for 1988 at 6.5. This figure seems to be plausible as it is supported by the Completed family size; it is the average figure for BRGM and in line with Arriaga's approaches. The national estimates show that fertility did not begin to decline in Tanzania until late 1970s or early 1980s. A modest fertility decline has been observed in the intercensal period 1978-1988 of one birth.

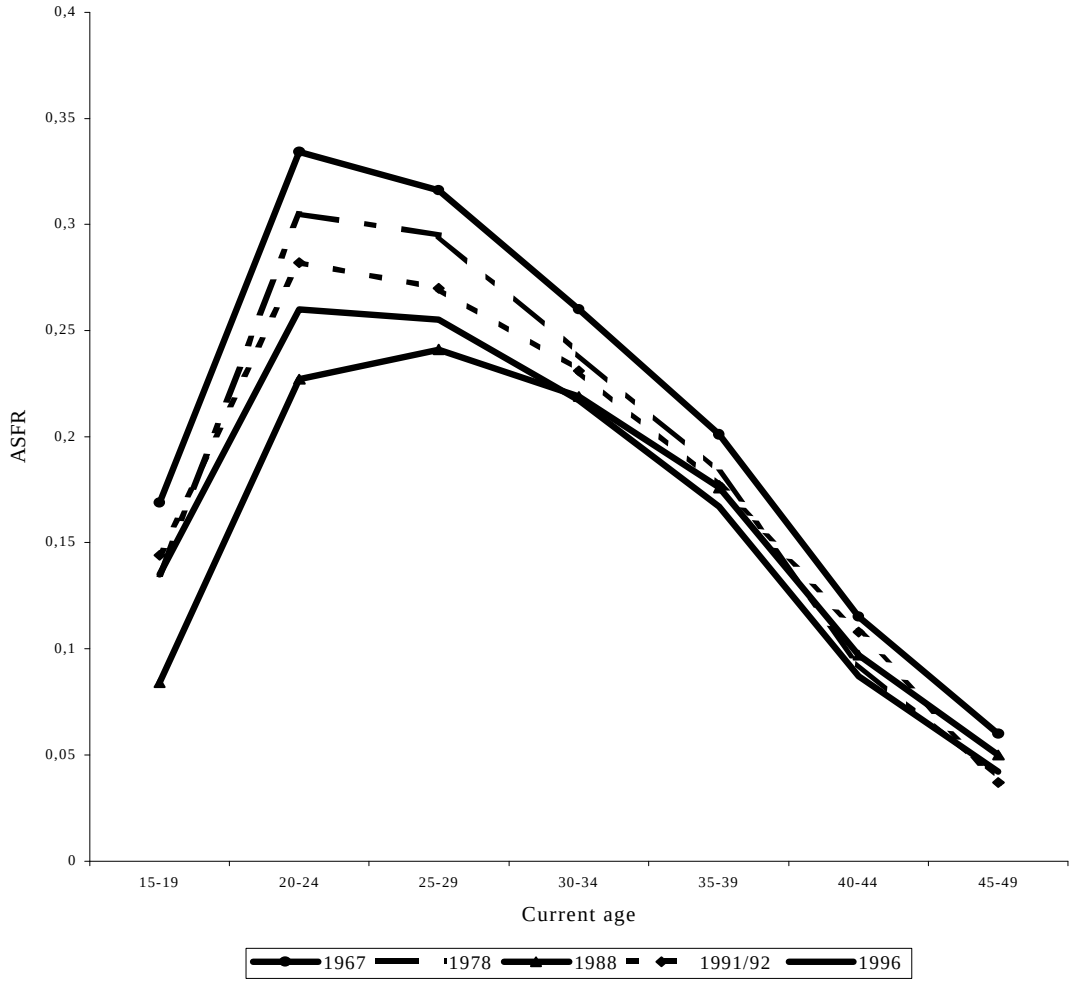
5.3. TDHS Estimates of Fertility

The Tanzania Demographic and Health Surveys provide an alternative data source with which to study recent fertility levels and trends in Tanzania. The complete birth history of live births for each woman was collected by using the women's individual questionnaire. It was used then for the calculation of fertility rates for the two surveys.

5.3.1. Fertility Patterns

The pace of reproduction reaches a peak in the age group 20-24 years and then declines steadily to the end of the reproductive life span. This pattern is broadly similar to that shown by the 1967 and 1978 population censuses (Figure 20). The distinctive feature for age pattern of fertility observed for all TDHS is that ASFR for age group 15-19 is higher than that observed in censuses. This suggests a rise in teenage child bearing although the mean age at child bearing was almost the same as observed in the censuses, namely 28.8 years.

Figure 20: Trends in age pattern of fertility for all censuses and TDHSs



Source: calculated from 1967, 1978, and 1988 Censuses; 1991/92 and 1996 TDHS

5.3.2. Summary of TDHS Fertility level Estimates

Table 44 gives the TFRs computed for the two TDHS by using the same methodologies explained above. The observed TFR was 6.2 and 5.8 for the 1991/92 TDHS and 1996 TDHS respectively. Some results of 1996 TDHS were dropped as they either did not satisfy the conditions or are not in line with the plausible estimates. The Completed family size and the BRGM fitted to current data, based on 30-34, are on the highest levels. An estimated TFR of 3.9 for BRGM fitted to current data, based on 15-19, is at the lowest level in the Tanzanian context. The 1996 TDHS did satisfy the conditions for using parity ratio in the estimation of the fertility level.

We can conclude that the TFR ranged between 5.9 to 6.2 in 1991/92, between 5.4 to 5.8 in 1996. This shows a slight decline of fertility in four years between the two TDHSs. The plausible estimate for the 1991/92 TDHS is 6.1 live births per woman and for the 1996 TDHS is 5.6 live births per woman. The summary of findings is presented in Table 44.

Table 44: Summary of fertility estimates by using various methods

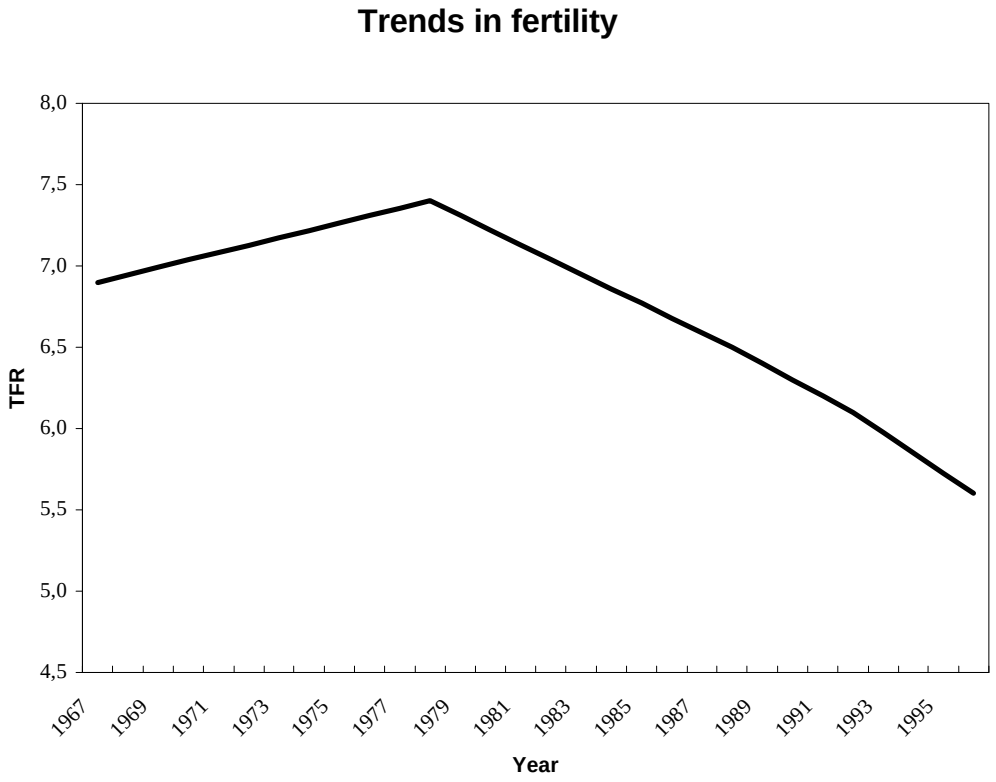
S/N	*Technique (Method)*	*1991/92*	*1996*
1	Observed/Reported	6.2	5.8
2	Officially documented	6.3	5.8
3	Completed family size	6.9	7.3***
4	Coale and Demeny $(P_3)^2/P_2$	6.0	5.9*
5	Brass modified Coale and Demeny's formulae $P_2(P_4/P_3)^4$	7.5	6.8*
	P/F Ratio Methods:		
6	P_2/F_2 adjustment factor	6.7	5.4
7	$½(P_2/F_2 + P_3/F_3)$adjustment factor	5.9	5.6
8	$1/3\ (P_2/F_2 + P_3/F_3 + P_4/F_4)$ adjustment factor	6.2	5.8
	BRGM fitted to current data based on:		
9	15-19	4.2	3.9**
10	20-24	5.5	5.2
11	25-29	6.1	5.8
12	30-34	6.5	6.1***
	Range	5.9-6.2	5.4-5.8
	Plausible	**6.1**	**5.6**

* Does not satisfy criteria
** On the lowest side
** On the highest side
Source: calculated from 1991/92 and 1996 TDHS

5.4. Fertility Trends

It seems there has been some decline in fertility during the recent past. The TFR was 7.0 in the early 1980s and decreased to 6.5 in the mid-1980s before reaching 6.1 at the end of the 1980s. In the beginning of the 1990s it declined to 5.6 during the two and a half years prior to the 1996 TDHS (Figure 21). Therefore Tanzania has experienced a reduction in fertility by about 1.6 births per woman (a 24 percent reduction) during a decade prior to the survey. This can be regarded as a substantial decline in fertility during the recent past.

Figure 21: Fertility trends in Tanzania 1967-1996



Source: calculated from 1967, 1978, and 1988 Censuses; 1991/92 and 1996 TDHS

The trend in sub-Saharan fertility has recently been the subject of an intense debate. Most of the countries that participated in the WFS conducted in the 1970s and early 1980s exhibited a rising trend in fertility (Cochrane and Farid, 1989). More recently, however, the DHS data obtained since 1986 show a declining trend in fertility in several countries, including Zimbabwe, Botswana and Kenya (Arnold and Blanc, 1990; Van de Walle and Foster, 1990; Freedman and Blanc, 1991; Rutenberg and Diamond, 1993).

This study has examined fertility trends in Tanzania using data from the three censuses and two TDHS. TFR was used as a measure of fertility. TFR estimated from the 1967 census data was 6.9 births per woman (Figure 21). There appears to have been an increase in fertility between 1967 and 1978 since the TFR estimated from the 1978 census data was 7.4. This is due to the reasons explained earlier. The 1988 population census produced a lower estimate of 6.5. This was the first indication of a decline in fertility in Tanzania, as these estimates are of the same type of data and used the same method at different dates.

The data obtained from the TDHS provide another opportunity to examine fertility trends in Tanzania. The estimated TFR from 1991/92 TDHS was 6.1 births per woman; it decreased to 5.6 births per woman for the 1996 TDHS. These results show a declining trend in fertility and are consistent with those results obtained using the census data. From this study, the current level of fertility in Tanzania is estimated to be 5.6 births per woman. Possible reasons for this decline will be discussed in chapter 8. However, the TFR of 5.6 is moderate according to sub-Sahara African standards but very high in comparison with other countries like Egypt 3.6, the Dominican Republic 3.2, and Brazil (2.5). The TFRs given in Table 45 support this statement.

Table 45: Observed TFR in sub-Saharan African countries and other selected developing countries

Country	*Year*	*TFR*
Benin	1996	6.3
Central African Republic	1994	5.1
Comores	1996	5.1
Côte d'Ivoire	1994	5.7
Ghana	1993	5.5
Kenya	1993	5.4
Mali	1995	6.7
Tanzania	1996	5.8
Uganda	1995	6.9
Zambia	1996	6.1
Zimbabwe	1994	4.3
Egypt	1995	3.6
Bangladesh	1996	3.3
Brazil	1996	2.5
Dominican Republic	1996	3.2

Source: Macro International Website

In order to understand the causes of the fertility decline in Tanzania, it is necessary to study the determinants of fertility. The next section therefore deals with the proximate determinants of fertility.

5.5. Proximate Determinants of Fertility

The causes of the fertility decline in Tanzania are explored by analysing the proximate determinants of fertility using the 1996 TDHS. In Chapter 2 we discussed intermediate variables thought of as providing the link between social, cultural and economic factors,

on the one hand, and the physiological processes which ultimately determine fertility on the other – the proximate determinants. In Chapter 3 we defined and discussed the methodology to compute indices for Bongaarts' model. Table 46 therefore shows the data used to compute indices for the Bongaarts' model and Table 47 gives a summary of the results. The estimate of C_m is 0.637. The estimate of C_m for Kibaha, Tanzania, calculated by Komba and Kamuzora (1988) was 0.72. This shows that the proportion of married women in Tanzania is declining; this has been fully discussed in Chapter 4.

Table 46: Data used to determine proximate determinants for the 1996 TDHS

a) Estimation of C_c

Methods	*U(m)*	*e(m)*	*e(m)*u(m)*
Pill	0.055	0.09	0.0050
IUD	0.006	0.95	0.0057
Injections	0.045	0.9	0.0405
Condom	0.008	0.62	0.0050
Sterilisation	0.019	1	0.0190
Others	0.051	0.7	0.0357
Total	**0.184**		**0.1108**

b) Estimation of C_m

Age	*BCMW*	*CMW*	*AW*	*g(a)*	*m(a)*	*g(a)*m(a)*
15-19	0.83	2.73	15.93	0.304	0.171	0.052
20-24	2.63	8.01	13.39	0.328	0.598	0.196
25-29	2.47	8.35	10.59	0.296	0.788	0.233
30-34	1.73	6.71	8.1	0.258	0.828	0.214
35-39	0.9	4.92	5.95	0.183	0.827	0.151
40-44	0.32	2.99	3.64	0.107	0.821	0.088
45-49	0.14	2.24	3.1	0.063	0.723	0.045
15-49	9.02	35.95	60.7	0.251	0.592	0.149
$\sum_{i=1}^{7} x_i$				1.538		0.980
$5^*\sum_{i=1}^{7} x_i$				7.692		4.898

BCMW = Births Currently Married Women; CMW = Currently Married Women; AW = All Women

Source: calculated from 1996 TDHS

Note: The method specific use-effectiveness levels, *e(m)*, were obtained from Bongaarts and Potter (1983; 84). Explanation for the computational procedure and notations is given in the text.

The C_m of 0.637 indicates that non-marriage alone suppresses maximum fertility by about 36 percent to a total marital fertility rate (TM). This means, if Tanzanian women were all married throughout their reproductive period, the TFR would be nearly one-sixth (1/0.637) higher than it is, with an average of 8.8 births per woman. Another way to interpret this estimate is to say that late marriage, non-marriage and divorce or widowhood together suppress fertility by about 36 percent.[25] Thus the reduction in the exposure to sexual intercourse which results from divorce and widowhood occurring during women's reproductive period seems to be contributing substantially to this suppression of fertility.

Table 47: Summary measure of the proximate determinants of fertility for 1996 TDHS

Index	*Intermediate step*	*Estimates of the index*	*Percentage suppresses maximum fertility*
C_m	Σm(a)g(a)=.980 Σg(a)=1.538	0.637	36
C_c	u=0.184 e=0.602	0.880	9
C_a	TA=0	1.000	0
C_i	i=15.7*	0.641	39

* From: Bureau of Statistics (1997; 83)

Sources: calculated from 1996 TDHS

TF = 5.6/(0.637 x 0.880 x 0.641 x 1)=15.6

Note: see text for details of the computational procedure
g(a) = the age-specific marital fertility rates
m(a) = the age-specific proportions of females currently married
u = proportion currently using contraceptives among married women of reproductive age (15-49)
e = average use-effectiveness of contraception
TA = total abortion rate
i = mean duration of postpartum infecundability
TF = total fecundity rate

[25] The question on temporary separation for married couples was not asked in the TDHS. Therefore the effect of temporary separation on fertility is not included in the calculation of C_m. This is likely to over-estimate the total marital fertility rate.

Among currently married women, 12.5 percent were using family planning methods at the time of the interview (Bureau of Statistics, 1997). Contraceptive prevalence is therefore very low in Tanzania. The estimated C_c of 0.88 implies that about 9 percent of maximum potential fertility have been suppressed by use of family planning methods (or that if no women were using contraception, the TFR would be only slightly higher than it is). Bongaarts (1978) states that C_c ranges between 0.8 and 1.0 for countries with TFR greater than 5.

Unfortunately, there are no data with which it would be possible to calculate the value of the index of induced abortion (C_a), which is therefore assumed to be 1.0. Although induced abortion is illegal in Tanzania (unless undertaken to save the life of the mother) illegal abortion does occur, especially amongst young unmarried Tanzanian women living in urban areas (Justesen et al., 1992). Therefore the assumption of C_a being 1.0 is likely to over-estimate fertility levels.

Table 47 shows that postpartum infecundability has the strongest fertility-inhibiting effect of all the indices in Tanzania. The estimated C_i of 0.64 means that postpartum amenorrhea and postpartum abstinence suppresses maximum potential fertility by about 39 percent to the total natural marital fertility rate (TN) of 10. This is mainly a result of universal and prolonged breast feeding. Nearly all women who have given birth (99 percent) breast feed their children for at least the first year of life and the mean duration of breast feeding is 21.2 months (Bureau of Statistics 1997). These indices for the four proximate determinants of fertility, together with a TFR of 5.6 given in the preceding section, give a total fecundity rate (TF) of 15.6. Bongaarts (1978) suggested a TF value between 13.5 and 17.0 for countries with a TFR greater than 5, and an overall mean figure of 15.3. Therefore, the TF of 15.6 estimated for all women is very close to Bongaarts' mean figure. This adds credibility to the results obtained in this study. The analysis of the proximate determinants of fertility suggests that late marriage, divorce and widowhood, and especially postpartum infecundability are the main factors reducing the prevailing levels of fertility in Tanzania compared to its biological maximum. However, the use of contraception has only a very minor fertility inhibiting effect.

5.6. Decomposition of Change in Fertility

It was concluded earlier that Tanzania's fertility has started to decline. However, it is believed that any change in a population's level of fertility is of necessity caused by a change in one or more of the proximate determinants. Bongaarts and Potter (1983) argued that the transition of fertility decline could easily be explained by the transition of a population from natural to controlled fertility. They further acknowledged that for countries where induced abortion is restricted, this control is exerted through a rise in contraceptive use. Therefore deliberate control of fertility will have a greater impact on marriage and postpartum infecundibility than on other proximate determinants.

The fertility control influences marriage and postpartum infecundibility as follows: the proportion of married women will decline because the use of contraceptives liberalises sexual activities in so far as women no longer have to worry about premarital pregnancies; the ultimate evidence of premarital sexual intercourse which is condemned by society. To avoid that women had get married to enjoy sexual intercourse. Secondly, the duration of breastfeeding will decline. Before the transition of fertility decline, breastfeeding is a means of contraception. With the use of modern contraceptive methods there is no need any more for long periods of breastfeeding. In this study we will examine the change in fertility measures by analysing not only the 1996 but also the 1991/92 TDHS indexes of proximate determinants.

Table 48: Data used to determine proximate determinants for the 1991/92 TDHS

i) Estimation of C_m

Age of women	*ASFR*	*m(a)*	*g(a)*
15-19	0.195	0.254	0.2924
20-24	0.267	0.685	0.3898
25-29	0.251	0.795	0.3157
30-34	0.208	0.806	0.2581
35-39	0.170	0.840	0.2024
40-44	0.103	0.842	0.1223
45-49	0.030	0.784	0.0383
Total	1.224	0.653	1.619

ii) Estimation of C_c

Method (m)	*u(m)*	*e(m)*	*e(m) x u(m)*
Pill	0.034	0.90	0.0306
Sterilisation	0.016	1.00	0.0160
Condom	0.007	0.62	0.0043
IUD	0.004	0.95	0.0038
Other	0.043	0.70	0.0301
Total	0.104	0.0848	

Source: calculated from 1991/92 TDHS

Table 49: Summary measure of the proximate determinants of fertility for the 1991/92 TDHS

Index	*Intermediate step*	*Estimates of the index*	*Percentage of suppression of maximum fertility*
C_m	Σm(a)g(a)=1.224 Σg(a)=1.619	0.756	24
C_c	u=0.104 e=0.815	0.908	9
C_a	TA=0	1.000	0
C_i	i=15.6*	0.587	41

* From: Bureau of Statistics (1993; 101).

TF = 6.1/(0.637 x 0.880 x 0.641 x 1)=15.1

Sources: 1991/92 TDHS

The decomposition of a trend in the TFR is based on the following equation for first (1) and last year (2):

$$\frac{TFR_2}{TFR_1} = \frac{C_{m2}}{C_{m1}} x \frac{C_{c2}}{C_{c1}} x \frac{C_{a2}}{C_{a1}} x \frac{C_{i2}}{C_{i1}} x \frac{TF_2}{TR_1}$$

Where:

Proportional change in TFR between the first and last year (P_f) is $\frac{TFR_2}{TFR_1}$

Proportional change in TFR due to a change in the index of marriage (P_m) is $\frac{C_{m2}}{C_{m1}}$

Proportional change in TFR due to a change in the index of contraception (P_c) is $\frac{C_{c2}}{C_{c1}}$

Proportional change in TFR due to a change in the index of induced abortion (P_a) is

$\frac{C_{a2}}{C_{a1}}$

Proportional change in TFR due to a change in the index of postpartum infecundability

(P_i) is $\frac{C_{i2}}{C_{i1}}$

Proportional change in TFR due to a change in the remaining proximate variables – natural fecundability, spontaneous intrauterine mortality, and permanent sterility (P_r) is

$\frac{TF_2}{TR_1}$

Then the above equation can be rearranged as:

$P_f = P_m + P_c + P_a + P_i + P_r + I$ where I is an interaction factor.

Table 50: Decomposition of the change in the TFR between 1991/92 and 1996

Factors responsible for fertility change in Tanzania between 1991/92 to 1996	*Percentage of change in TFR*	*Distribution of percentage of change in TFR*[26]	*Absolute change in TFR*[27]
Proportion of women married (P_m)	-15.7	-191.5	-0.96
Contraceptive practice (P_c)	-3.1	-37.8	-0.19
Practice of induced abortion (P_a)	0	0	0
Duration of post partum Infecundability (P_i)	9.2	112.2	0.56
Other proximate determinants (P_r)	2.6	31.7	0.16
Interaction (I)	-1.2	-14.6	-0.07
Total (P_f)	-8.2	100	-0.5

Source: calculated from 1991/92 and 1996 TDHS

[26] This is obtained by distributing the total change in TFR (i.e. 191.5 was obtained by dividing 15.7 by the total and multiplying by 100).

[27] The total value for this column was obtained by subtracting TFR of the 1991/92 TDHS from of the 1996 TDHS. Then the total is multiplied by the distribution of change in TFR we get the Absolute change in TFR.

The table above indicates that the TFR decline of 8.2 percent between 1991/92 and 1996 can be decomposed into a 15.7 percent decline due to a decrease in the proportion of women married, a 3.1 percent decline due to an increase in contraceptive practice, and a 9.2 percent increase due to shortening of the duration of postpartum infecundibility. The remaining proximate variables together contribute only 1.2 percent, and the interaction factor equals –1.2 percent.

In order to ascertain the findings above, let us investigate the decomposition of change in birth rates. The advantage of this method is that it takes the contribution of shifts in age structure within the reproductive ages into account as well as changes in the proportion of the women in reproductive age among the total population. The necessity of adopting these two approaches is due to the poor reporting of marital status and possible overstatement of marital fertility rates.

The CBR is linked to its proximate determinants by the following equations:

$CBR=SxC_mxC_cxC_axC_ixTF$

S is an age-sex composition factor given by $S = \frac{CBR}{TFR}$

Variations in S are caused by changes in the population's age-sex structure. Then

$P_b = P_b + P_m + P_c + P_a + P_i + P_r + I$ although

$p_b = CBR_2/CBR_1-1$ (proportional change in the CBR between two periods).

$P_s = S_2/S_1-1$ (proportional change in CBR due to a change in the age-sex composition).

CBR in 1991/92 was found to be 42.8 and 40.8 per 1,000 population in 1996.

Table 51: Decomposition of the change in the CBR between 1991/92 and 1996

Factors responsible for CBR change in Tanzania between 1991/92 to 1996	*Percentage of change in CBR*	*Distribution of percentage of change in CBR*	*Absolute change in CBR*
Age-sex structure (P_s)	3.8	80.9	1.6
Proportion of women married (P_m)	-15.7	-334.0	-6.7
Contraceptive practice (p_c)	-3.1	-66.0	-1.3
Practice of induced abortion (P_a)	0	0.0	0.0
Duration of post partum Infecundability (P_i)	9.2	195.7	3.9
Other proximate determinants (P_r)	2.6	55.3	1.1
Interaction (I)	-1.5	-31.9	-0.6
Total (P_b)	-4.7	100	-2.0

Source: calculated from 1991/92 and 1996 TDHS

Table 51 indicates that CBR has declined by 4.7 percent from 42.8 to 40.8 per 1,000 population. The contribution of the age-sex composition change contributes a 3.8 percent increase to the CBR from 1992 to 1996. This figure indicates that even if there has been a decline in fertility in Tanzania for the period between two TDHSs, the reproductive age structure still affects the decline of fertility in Tanzania. Hence, there is a need to reduce the number of births in a year so as to have a potential decline in fertility in the future. However, it confirms that the marital status can also be explained as one factor attributed to the fertility decline in Tanzania.

5.7. Socio-Demographic Determinants of Fertility

The study of proximate determinants of fertility is not enough to inform policy. The indirect determinants need to be considered in order to understand the social and economic factors which can be manipulated to change fertility levels. In the analysis that follows, we compute the variation in the mean number of children ever born (MNCEB) with various social and demographic factors. Since the number of children ever born is known to be highly associated with age, it is necessary to examine differentials in cumulative fertility in different age groups of women. The results are summarised in Table 52.

Age at first birth in a non-contracepting society becomes an important determinant of the length of reproductive life and thus is highly and negatively correlated with fertility. Late age at first birth shortens the reproductive period of a woman, which will consequently reduce the total number of children ever born (and vice versa). This pattern holds for age at first marriage, and age at first sexual intercourse except for the pattern given for women aged less than 25 years in the table. But if we remove the current age effect (Table 52), again it shows the same pattern.

The data of older women at the age of 35-49 show that women who engaged in sexual intercourse earlier than age 15 had approximately three births more than those who had first sex experience at age 25 or more. A similar pattern is repeated for women who started child bearing before age 15, they have about three births more than women married after age 24. Exposure to the risk of child bearing at very early age can be

associated with high fertility as compared to the late entry for all three broad age groups. On the other hand, early exposure to the risk of child bearing could have a negative effect on the level of fertility because physical maturity especially of the pelvis often lags behind the ability to conceive. As such, the pelvis and other reproductive organs may not be mature enough for delivery of the foetus when conception takes place. These obstetrical complications of young women may sometimes result in secondary infertility (Chapter 4).

Married women have much higher cumulative fertility in all three broad age groups than their counterparts who have never married. Divorced women have the lowest fertility among the three ever-married groups whereas widowed women have slightly higher fertility than married women in the age groups 15-24. In general for all women, it seems widows have higher fertility than any other group. The difference between married women and widows is surprisingly high 1.186. This may be due to the participation in sexual activities after the death of their spouses.

It is interesting to note that younger women in polygamous marriages have higher cumulative fertility compared to women in monogamous marriages. This situation may be attributed to the competition effect, as young women in polygamous union would like to have as many children as possible to either compete with older wives of the same union or to satisfy the husbands need if the other wife is infertile. Moreover, the reason for polygamy is either to have children or to have many children, hence contraception might only be practised at older ages. On the other hand, older women (35-49) in polygamous marriages have lower fertility than women in monogamous marriages. This may be attributed to the reason for the necessity of polygyny to a family as explained in the former sentence. The frequency of intercourse is expected to be higher for a woman in monogamous marriage, than a woman in a polygamous marriage keeping other things constant. However, the prevalence of polygyny is likely to rise by the failure of the first wives to bear children. Polygyny would seem to be a result of infertility in such cases and not its cause (Ahmed, 1986; UN Economic Commission for Africa, 1983). The result of all women (15-49) shows that polygamous women have higher fertility compared to women in monogamous unions.

It seems that there is no sound difference in fertility among the different religious groups in Tanzania. The differences are marginal in all age groups except that young women in the category "others" have higher mean CEB than women in other categories. The category "others" includes women with traditional faiths or no religion, who are more likely to marry at a younger age particularly if residing in rural areas. However, with regard to older women, Moslems have the lowest fertility of all. Protestants have higher fertility in comparison with Catholics. In general, Catholics have higher fertility than other religious beliefs and Moslems have the least fertility of all.

Women residing in urban areas have lower fertility than their rural counterparts. As stated in Chapter 2, this pattern is also true for all countries in sub-Saharan Africa (Cohen, 1993). The difference becomes substantial as the age of women increases.

Table 52: Mean number of childrean ever born by selected socio-demographic characteristics and current age

Characteristics	*Age of women*			
	15-24	*25-34*	*35-49*	*15-49*
Age at first Birth				
<15	2.691	5.316	7.458	5.868
15-17	1.874	4.418	7.138	4.632
18-19	1.508	3.668	6.663	3.830
20-21	1.318	3.110	6.193	3.535
22-24	1.073	2.662	5.289	3.501
25+		1.763	4.208	3.232
Age at first Marriage				
<15	1.885	4.557	6.708	5.205
15-17	1.425	3.887	6.607	4.085
18-19	1.217	3.255	6.236	3.518
20-21	1.081	3.036	5.735	3.500
22-24	.796	2.542	5.383	3.155
25+		1.962	3.985	3.237
Age at first sexual Intercourse				
at first union	1.356	3.922	6.697	4.549
<15	1.177	3.596	6.386	3.449
15-17	1.018	3.539	6.290	3.268
18-19	1.086	3.083	6.204	3.004
20-21	0.746	2.762	4.780	2.580
22-24	0.777	1.863	4.382	2.346
25 +		1.272	3.617	2.088
Marital Status				
Never Married	.183	1.244	3.429	0.318
Married	1.412	3.700	6.608	3.942
Widowed	1.560	3.419	6.074	5.128
Divorced	1.196	2.534	5.013	3.169

Characteristics	*Age of women*			
	15-24	*25-34*	*35-49*	*15-49*
Polygyny				
Monogamous	1.353	3.700	6.542	3.794
Polygamous	1.488	3.577	6.445	4.332
Religion				
Moslem	.764	3.350	6.038	2.862
Catholic	.777	3.478	6.372	3.125
Protestant	.663	3.364	6.556	2.964
Other	1.167	3.643	6.623	3.817
Place of Residence				
Rural	.830	3.619	6.571	3.308
Urban	.618	2.817	5.389	2.366
Women's level of education				
No Education	1.071	3.995	6.633	4.567
Primary incomplete	.584	3.876	6.693	3.159
Primary complete	.805	3.201	5.334	2.289
Secondary +	.392	2.425	4.804	1.779
Partner's education				
No Education	.771	3.417	6.315	4.763
Primary incomplete	1.341	3.625	6.492	5.201
Primary complete	1.375	3.412	5.548	2.945
Secondary +	1.364	3.588	6.613	3.819

Source: calculated from 1996 TDHS

Partner education is another factor known to have an influence on fertility. The spread of education and literacy among women is believed to lead to fundamental changes in their reproductive behaviour. Table 52 shows that cumulative fertility decreases as the mother's level of schooling increases. Older women (35-49 years old) shows that women without education have an average of 7 children per woman compared to 5 children for women with secondary education. The pattern for young women is not clear perhaps because they have just started the reproductive process. Partner's education gives more or less a similar pattern to that observed for women's education. One possible explanation is that women's education is highly correlated with their partners' education. There is also a possibility that partner's education influences fertility in a similar way as women's education.

In summary, the descriptive analysis (Table 52) shows that age at first intercourse, age at first marriage, age at first birth, women's level of education, marital status, polygyny, and type of place of residence have a significant influence on cumulative fertility. A woman is likely to have a large number of children ever born if she had her first sexual

intercourse, marriage and birth before reaching the age of 15, lives in rural areas, and has little or no education.

5.8. Regression Analysis

After examining the differentials in fertility, we are now in a better position to pick up associated variables and subject them to a more complex analysis in order to examine their relative importance as determinants of fertility. However, it is necessary also to account for the interrelationships between the chosen independent factors.

Multiple regression analysis is the multivariate analysis undertaken to examine the determinants of cumulative fertility in Tanzania. Only ever given birth women are included in the regression analysis.

Table 53: The variables used in the second regression analysis

Variable	*Status*	*Description and Category*	*Abbreviation used*
Number of children ever born to a woman	Dependent variable	continuous variable	V212
Age	Independent variable	15-19	RC
		20-24	A2
		25-29	A3
		30-34	A4
		35-39	A5
		40-44	A6
		45-49	A7
Age at first birth	Independent variable	<15	RC
		15-17	B2
		18-19	B3
		20-21	B4
		22-24	B5
		25+	B6
Age at first marriage	Independent variable	<15	RC
		15-17	M2
		18-19	M3
		20-21	M4
		22-24	M5
		25+	M6
Age at first sexual intercourse	Independent variable	<15	RC
		15-17	I2
		18-19	I3
		20-21	I4

Variable	*Status*	*Description and Category*	*Abbreviation used*
		22-24	I5
		25+	I6
Marital status	Independent variable	Never married	RC
		Currently married	Ma2
		Widowed	Ma3
		Divorced	Ma4
		Not living together	Ma5
Polygyny	Independent variable	Monogamous	RC
		Polygamous	Po1
Religion	Independent variable	Catholic	RC
		Moslem	R1
		Protestant	R3
		Other/none	R4
Woman's educational level	Independent variable	None	RC
		Primary incomplete	E2
		Primary complete	E3
		Secondary +	E4
Woman's partner's educational level	Independent variable	None	RC
		Primary incomplete	Pe2
		Primary complete	Pe3
		Secondary +	Pe4
Place of Residence	Independent variable	Rural	RC
		Urban	U1

RC = Reference Category

The nine variables used in the analysis along with a brief description of their measurement are given in Table 53. The response variable is the number of children ever born (CEB) which ranges from 0 to 15. We have two models, in the first one we treat explanatory variables as pure continuous variables. In the second model, all explanatory variables are categorised. Hence the regression equation used is given as:

CEB = f (age, age at first birth, age at first marriage, age at first intercourse, marital status, type of marriage, education, partner's education, religion, place of residence). Hence

$$CEB = \alpha + \sum_{i=1}^{k} \theta_i$$

CEB = + $_1$(AGE)+ $_2$(AFSI)+ $_3$(AFM)+ $_4$(AFB)+ $_5$(EDU)+ $_6$(POR)+ $_7$(RELIGION)+ $_8$(MARITAL) + $_9$(POLYG)

is a constant and $_{1,\ldots,}$ $_9$ are unstandardised regression coefficients for each of the respective explanatory variables.

Table 54: The OLS regression coefficients for the determinants of children ever born

Variable	*Unsta. Coeffic.*	*Level of Sig.*	*Std. Error*
(Constant)	1.337	0.000	0.223
Current age – respondent	0.233	0.000	0.004
Age at first intercourse	0.015	0.208	0.012
Age at first marriage	-0.057	0.000	0.009
Age of respondent at first birth	-0.201	0.000	0.011
Education in single years	-0.023	0.017	0.010

R^2 (adjusted) = .643
Durbin – Watson = 1.846

Source: calculated from 1996 TDHS

Table 54 gives the ordinary least square (OLS) regression coefficients (unstandardised) for all five explanatory variables along with their standard errors (SE) computed for unstandardised coefficients. It is interesting to note that all variables selected are highly significant and explain the variation in CEB by 64.3 percent except age at first intercourse. The apparent effect of age on CEB is that an increase of five years in the age of a woman results in an increase in the numbers of births to a woman by one birth. If a woman starts child bearing at age 15, she is statistically expected to have 7 children at the end of her child bearing period. This finding corresponds with the TFR of almost 5.6 in Tanzania we obtained in this study.

Age at first marriage seems to be a weak factor in determining fertility in Tanzania although it is significant as raising the age at first marriage by 10 years results in a reduction of 1 child. However age at first birth is a strong factor in determining fertility in Tanzania as increasing age at first birth by 5 years results in a decrease in the numbers of children expected to be born to a woman by one child. This finding corresponds with the findings in Chapter 4 that delaying child bearing after the adolescent period has an impact on fertility.

Table 55 shows a weak relationship between education and cumulative fertility, though this relationship is less significant. Generally speaking, it is expected that the higher the education of women the lesser the number of children ever born (linearity). However, this finding seems to suggest that there is a non-linearity between the education of a woman and cumulative fertility. Education may break down birth-spacing practices without lowering fertility desires or increasing age at first birth and marriage, hence it

might be associated with much higher fertility, referred to as a compensation (Cochrane, 1979; Cohen, 1993), although in bivariate analysis it was found that education signals a significant influence on cumulative fertility.

The regression analysis above was to determine the association between fertility and other variables. It is necessary to estimate the net effect of each variable when variations in the other selected factors are controlled. The independent variables interrelate with each other and their interactions can alter the effects observed in Table 54. All variables used in the following model have been treated as dummy variables (Table 52). For each background characteristic, one category has been selected as the reference category (RC) and is omitted from the equation. The unit of analysis is all women who have experienced a live birth irrespective of their marital status.

Table 55: Regression results of the relationship between fertility and some selected variables

Variable	*Category*	*Dummy*	*Unstd. Coeffic.*	*Std. Error*
Age	15-19	RC		
	20-24	A2	0.932***	0.106
	25-29	A3	2.374***	0.108
	30-34	A4	3.600***	0.111
	35-39	A5	4.766***	0.116
	40-44	A6	5.806***	0.123
	45-49	A7	6.374***	0.129
Age at first sexual intercourse	<15	RC		
	At union	I2	0.253***	0.075
	15-17	I4	0.017	0.073
	18-19	I5	0.114	0.089
	20-21	I6	-0.113	0.125
	22-24	I7	0.057	0.202
	25+	I8	0.080	0.289
Age at first marriage	<15	RC		
	15-17	M2	0.108	0.084
	18-19	M3	-0.043	0.098
	20-21	M4	0.087	0.110
	22-24	M5	-0.166	0.128
	25+	M6	-0.837*	0.140
Age at first birth	<15	RC		
	15-17	B2	-0.419***	0.104
	18-19	B3	-0.886***	0.112
	20-21	B4	-1.424***	0.121
	22-24	B5	-1.989***	0.133
	25+	B6	-2.877***	0.163

Variable	*Category*	*Dummy*	*Unstd. Coeffic.*	*Std. Error*
Marital status	Never married	RC		
	Currently married	MA2	0.828***	0.137
	Widowed	MA3	0.472**	0.178
	Divorced	MA4	0.091	0.163
	Not living together	MA5	0.409*	0.190
Polygyny	Monogamous	RC		
	Polygamous	PO2	-0.212***	0.058
Woman's educational level	None	RC		
	Primary incomplete	E2	-0.016	0.070
	Primary complete	E3	-0.179**	0.065
	Secondary +	E4	-0.124	0.125
Partner's educational level	None	RC		
	Primary incomplete	PE2	0.083	0.076
	Primary complete	PE3	-0.187**	0.072
	Secondary +	PE4	-0.236**	0.091
Religion	Catholic	RC		
	Moslem	R1	-0.366***	0.055
	Protestant	R3	-0.056	0.057
Place of Residence	Rural	RC		
	Urban	U1	-0.458***	0.056
Constant			1.524***	0.169

R^2 = .694
R^2 (adjusted) = .692
Durbin – Watson = 1.858
*** Highly significant at level .001
** Significant at level .01
* Significant at level .05
Source: calculated from 1996 TDHS

As Table 55 shows, all the independent variables included in the multiple regression analysis explain 69 percent of the variance in the number of children ever born. But they are not the only variables responsible for the variation in the number of children ever born though they play a very significant role.

The results in Table 55 show that the respondents' number of children ever born are determined to larger extent by age; the relationship is statistically significant. In general,

these results show that an increase of 5 years in age of a woman results in an increase of one birth i.e. a woman increases the number by one child in five years.

The regression results suggest that there is an inverse relationship between age at first birth and fertility. The higher the age of the respondent at first birth the lower the number of children ever born. Those who start child bearing early have a longer period of exposure to the risk and are thus expected to have more children than those who start child bearing late. In general the relationship is seen to be highly significant. A women who started child bearing between the age of 18-19 will have one child less than those who started child bearing below 15 years. Women who started child bearing between age 20 and 24 bear less than 2 births compared with those who start child bearing before attaining age 15. However, women who got their first child at an age above 24 years, everything being equal, are expected to have 3 children less than those who start child bearing aged less than 15 years; the difference is highly significant. In general the study found a strong relationship between age at first birth and fertility.

It seems that women whose first sexual intercourse experience coincides with first union have the highest fertility compared to those who experience sexual intercourse out of wedlock and before attaining age 15; the difference is statistically significant. However, it seems that age at first intercourse cannot solely explain the cumulative fertility of a woman.

Marriage is a weak factor in explaining fertility. Perhaps this is due to the increase of premarital births in Tanzania as seen in Chapter 4. However, it is after attaining age 24 when age at first marriage become significant in reducing fertility in Tanzania. There is no significant difference in the number of children a woman bears if she marries before attaining age 24. In general, the table reveals that age at first marriage has an inverse relationship with motherhood provided that the age at first marriage is above 24 years. Marital status is significant in relation to the fertility of a woman. Married women had more number of CEB than never married women; the relationship is highly significant. It seems that women in polygamous unions had fewer CEB than those in monogamous unions; the relationship is highly statistically significant. In bivariate analysis it was also found that women in polygamous union above 25 years have lower mean number of children ever born than those in the monogamous union (Table 52).

As can be seen from Table 55, it seems there is no significant relationship between the number of children ever born and the completion of secondary education contrary to our expectations. No education was used as the reference category. However women with secondary and above levels of education are expected to have lower fertility than women with no education and even lower than those who completed their primary education. This inverse relationship between education and fertility is partly due to attitude and value changes that come with education. Unlike women without education, these women are more likely to use modern methods of contraception to space their births. In addition, they are known to start child bearing late because they stay in the school system for more years than those with primary education. On the other hand women who completed their primary education have less CEB compared to women who did not attend school; the relationship is statistically significant. Perhaps women who complete secondary education use the 'compensation factor' as explained in Chapter 4.

In terms of religion, Catholic was used as the reference category. Moslems have the lower fertility than Catholics in Tanzania; the difference is statistically significant. Catholics are generally expected to have high fertility compared to other religious denominations due to the Vatican anti-contraceptive use doctrine. This finding contradicts the finding by Lucas (1980) and general knowledge that Moslems have higher fertility compared to Christians. This finding proves the church's influences on their believers. We are tempted to say so as in Chapter 4 we found that Catholics have higher age at first birth compared with others denominations in Tanzania and that they are expected to have lower fertility than other religious denominations, but they have high fertility. The only reason for this contradiction may be that while others contracept Catholics do not.

The regression results show that the type of residence influences the number of children ever born. It seems that women residing in urban areas have fewer children than those in the rural areas; the difference is very significant. Although in Chapter 4 we found rural residents to have higher age at first birth, the difference for urban residence might be due to contraceptive use and modernity in urban areas.

5.9. Concluding Remark

This chapter has shown that according to the 1978, 1988 population censuses and TDHSs fertility in Tanzania declined from 7.4 births per woman in the 1970s to 6.5 in the 1980s and further to 5.6 in the early 1990s. Overall, there was a 24 percent decline in fertility during a decade prior to the 1996 TDHS. In Chapter 4 we noticed a slight shift from low age at first child bearing to higher age in recent years. Although fertility is still high, we can say the Tanzanian population is in a transition stage of fertility decline. A further decline in fertility depends on the success of the family planning programme in raising contraceptive prevalence and changing people's positive attitudes towards large families.

The analysis of proximate determinants of fertility has shown a significant contribution by breastfeeding (through its effect on postpartum infecundability) on lowering fertility levels below the biological maximum. This is due to the fact that the use of contraception is not widespread in Tanzania. The contributions of postpartum abstinence, late marriage, divorce and widowhood in lowering fertility seem to be minimal. Therefore the use of contraceptives should be encouraged if a further decline in fertility is intended. Unfortunately, the effect of abortion on fertility could not be assessed in this analysis because of non-availability of data.

The analysis of proximate determinant on the other hand confirmed that Tanzania fertility is in transition of decline. For the period between two TDHS, there was a decline of 8.2 percent in TFR due to a decrease in the proportion of women married, an increase in contraceptive practice, and the remaining proximate variables i.e. natural fecundability, spontaneous intrauterine mortality, and permanent sterility also played a significant role in fertility decline. Although breast-feeding practice contributed to the decline in fertility in Tanzania, the study found out that there is a shortening of the duration of postpartum infecundibility (breast feeding practice). This has to be more compensated by contraceptive use if further decline of fertility in Tanzania is to be achieved.

The socio-demographic determinants of fertility suggest the factors that can be manipulated in order to accelerate a decline in fertility. Discourage premarital sexual intercourse, delay marriage up to at least 22 years, improve women's level of education,

delay the age at first birth to at least 22 years, and reduce infant and child mortality. Raising a woman's education level would probably raise her age at first intercourse and birth, reduce child loss, and improve her status in general. The most important way in which education influences fertility is through delaying the first birth by using modern contraceptives.

Chapter 6

6. Contraception in Tanzania

6.1. Introduction

In discussing proximate determinants of age at first birth and fertility (Chapter 2), the most frequent proximate determinant was contraceptive use. In this study contraception means the use of modern methods of family planning. Contraception is important because it can delay the first birth and reduce fertility by either spacing or limiting births. In Chapter 4, we found that 14 percent of sexually active women in Tanzania were doing something to delay their first births. In Chapter 5 we found that in Tanzania fertility has started declining. This was confirmed by the results of decomposition of change in fertility in so far as the proportion of married women is decreasing and the duration of breastfeeding is shortening while contraceptive practice is slightly compensating natural birth control. Therefore it is necessary to understand the levels and determinants of contraceptive use in order to formulate policies supporting proper strategies for raising contraceptive prevalence.

An important term that needs to be introduced at this point is *contraceptive transition*. Contraceptive transition is a process that takes place when individuals or couples become able to conceptualise and accept logically and emotionally their own ability to control their fertility. They must perceive that it is in their own self-interest and within their power to control births by spacing or limiting them. Moreover, they must have reasonable access to an acceptable and reliable means of controlling fertility. These conditions mean that the couple is 'ready, willing and able' to reduce their fertility, and actually use a contraceptive. Freedman and Freedman (1989) also provide a similar description of the process, stating that demand for fertility control has two components, namely the desire to limit the number of births or to space them widely, and the readiness to use fertility control measures for either purpose.

There may be a wide range of cultural, socio-familial, economic or programmatic factors that make it difficult for an individual to implement the decision to contracept. These factors include the financial and cultural costs of using contraception. These

factors will influence the decision to attempt the use of contraceptive. Thus the decision to initiate contraception is, 'partly a function of the particular mix of means available to the decision-maker and a subjective evaluation of the cost. These costs may be high at the outset of the transition, but they erode more rapidly than method-specific costs' (Robinson and Cleland, 1992: 118).

If an individual decides to attempt to practice family planning, the question then becomes a choice of the method, and method-specific costs become relevant. Such factors as financial costs of various methods, various sources, method-specific side effects, and personal preferences become more important. In this regard, it is clear that certain methods will have much higher psychosocial costs than others and this will influence their adoption.

Finally, once a method has been adopted, the user's experience with that method (and the perceived cost) will determine whether the user continues or discontinues use. The information and counselling that the user received at the time of the initiation of the use will very likely influence subsequent continuation or discontinuation. Similarly, the other methods available will play an important role in whether the dissatisfied user becomes a 'switcher' or a 'discontinuer'.

Unmet need may arise as the result of factors at any one of these decision points. It may result from imprecise or weak fertility control goals on the part of the individual or couple, from high generalised 'costs' of attempting regulation, from a limited method mix or high method-specific costs, or from limited or inaccurate information (Robinson and Cleland, 1992). Unmet need may also arise from discontinuation of the method use.

It seems likely that the point at which unmet need emerges shifts as the contraceptive transition progresses. In the pretransition and early stages of transition, the precision and intensity of fertility reduction goals as well as the general costs of undertaking regulation are likely to be the major factors leading to unmet need. Later on in the transition, method-specific costs, availability, and information become more important.

6.2. Levels and Determinants of Contraceptive Knowledge and Use

The knowledge of levels and determinants of contraceptive use is important in any effort to reduce fertility within a country. As Caldwell and Caldwell (1977) point out, the path of fertility will be determined by the extent to which modern contraception substitutes abstinence, and ultimately by the extent to which it is more efficient than periodical abstinence as a means of fertility regulation.

Several studies have been carried out to investigate factors influencing the use of contraceptives. In Tanzania such studies include that of Muna (1987), who focused on the Morogoro urban district; Madihi (1988) who did a case study of married Dar es Salaam women; Nanyaro (1992), whose work was based on the Dodoma region; Ghuhiya (1993), who focused on Zanzibar; and Mbago (1996), who did a case study of eight regions. All these studies with exception of Mbago's, analysed factors influencing contraceptive use based on simple cross tabulations. No rigorous statistical analysis was carried out. Mbago (1996) focused on the following eight regions: Dar es Salaam, Pwani, Kilimanjaro, Dodoma Rukwa, Ruvuma, Mwanza, and Shinyanga. In his study, Mbago carried out multivariate analysis to ascertain the relative importance of factors in a multiple logistic regression model. But his study cannot be generalised as Tanzania has 25 different regions.

The major focus of the following sections is the examination of the extent of contraceptive use and the identification of sub-groups of women who are particularly unlikely to use contraception. The chapter examines the individual-level factors related to contraceptive use only. Both tabular analysis and logistic regression analysis are used for these purposes. The background variables used throughout this chapter are similar to those used in previous chapters. However, before studying contraceptive use, it is important to have an idea about the knowledge of contraceptive methods among women. As explained earlier in the introduction of this chapter it is an important pre-requisite of contraceptive use.

In this study we will study currently married women and never married women separately because theoretically family planning services in Tanzania are not provided for unmarried women. This is particularly important because premarital sexual activity is very common as seen in Chapter 4. The only way to avoid premarital pregnancies of

which most are unwanted, is to take proper measures to avoid premarital conception (fertilisation).

6.2.1. *Knowledge of Contraception*

The 1996 TDHS collected information about the knowledge of contraception for all respondents. The interviewer asked the respondent to name all the family planning methods of which she had heard. For methods not mentioned by the respondent, the interviewer gave a one-line description and asked again whether the respondent had ever heard of it. This is known as 'probing'. The respondent is considered to have known a method if she said that she had heard of it either spontaneously or after probing. Table 56 presents the percentage distribution of the respondents according to their knowledge of contraception and selected background characteristics. A woman is considered to know a **modern method** if she stated that she knew at least one of the following methods: the pill, intrauterine device (IUD), injection, foam or jelly, barrier methods (diaphragm, condom), female or male sterilisation. A woman is considered to know only **traditional methods** if she stated that she knew only one of the following methods: periodic abstinence, calendar (safe period), Billings (temperature and or cervical mucus method), withdrawal (coitus interuptus), or any other traditional method known as herbs and strings. The 'none category' includes all women who said they did not know any method at all.

Table 56 indicates a high level of knowledge (88.5 percent) among currently married women in Tanzania; 87.8 percent know at least one modern method. Only 0.7 percent know only a traditional method, while 11.5 percent of currently married women do not know any method of family planning. However, the level of knowledge of never married women is lower than of currently married women. Only 69.8 percent of the never married women claimed to be aware of a contraceptive method. A major challenge for Tanzania therefore is to work out how to introduce knowledge of family planning methods to the 30.2 percent of never married women and 11.5 percent of currently married women who have never heard of a contraceptive method.

Table 56: Percentage distribution of women by knowledge of contraception by selected background characteristics

	Currently married				*Never married*			
Characteristics	*None*	*Tradit.*	*Modern*	*N*	*None*	*Tradit.*	*Modern*	*N*
Place of Residence								
Urban	2.5	0.1	97.4	1130	14.8		85.2	560
Rural	13.9	0.9	85.2	4282	36.7	0.1	63.2	1327
Education								
None	24.3	1.8	73.9	1841	55.8		44.2	217
Incomplete primary	9.4	0.4	90.2	908	47.0		53.0	538
Complete primary	3.7	0.1	96.1	2439	19.7	0.1	80.2	912
Secondary +			100	223	7.7		92.3	221
Complete primary	6.5	0.4	93.2	2428				
Secondary +	2.9	0.3	96.8	657				
Religion								
Moslem	5.8	0.5	93.8	1697	28.6		71.4	539
Catholic	8.5	0.4	91.1	1621	29.9	0.1	70.0	676
Protestant	8.8	0.7	90.5	1330	25.2		74.8	548
Other	35.4	2.1	62.4	748	62.3		37.7	122
Polygyny								
Monogamous	9.3	0.7	90.0	3853				
Polygamous	17.0	0.9	82.1	1525				
Age at first birth								
<15	16.0	2.0	82.1	351	10.0		90.0	10
15-17	11.8	0.5	87.7	1582	10.1		89.9	109
18-19	7.9	0.6	91.5	1437	5.5		94.5	128
20-21	9.4	0.5	90.1	852	3.8		96.2	78
22-24	13.9	1.0	85.2	512			100.0	36
25 +	15.0	1.7	83.3	234	17.9		82.1	28
Age at first intercourse								
At first union	14.7	1.3	84.1	1587				
<15	20.4	0.8	78.8	707	18.1	0.7	81.2	138
15-17	10.6	0.4	89.0	1646	13.5		86.5	453
18-19	5.0	0.5	94.5	599	4.2		95.8	143
20-21	5.0		95.0	218	6.3		93.8	64
22-24	4.8	1.6	93.5	62			100.0	17
25 +	3.4	3.4	93.1	29	13.3		86.7	15
Age at first marriage								
<15	19.2	1.5	79.4	756				
15-17	11.5	0.7	87.8	2073				
18-19	8.7	0.6	90.7	1171				
20-21	8.3	0.6	91.1	689				
22-24	12.2	0.5	87.3	426				
25 +	10.1	0.7	89.2	297				
Children ever born								
None	18.5	0.7	80.9	444	36.3	0.1	63.6	1499
1-2	10.4	0.4	89.2	1612	7.6		92.4	341
3-4	7.7	0.8	91.5	1343			100.0	37

	Currently married				*Never married*			
Characteristics	*None*	*Tradit.*	*Modern*	*N*	*None*	*Tradit.*	*Modern*	*N*
5-6	11.8	0.8	87.4	924	14.3		85.7	7
7+	14.9	1.1	84.0	1089			100.0	4
Current age								
15-19	20.0	0.2	79.8	401	39.8	0.1	60.1	1292
20-24	9.3	0.4	90.3	1131	9.8		90.2	410
25-29	7.4	0.5	92.1	1184	7.5		92.5	106
30-34	9.0	0.3	90.7	947	10.0		90.0	50
35-39	11.5	0.9	87.6	740	20.0		80.0	15
40-44	14.8	1.1	84.1	561			100.0	10
45-49	21.7	2.5	75.8	447			100.0	4
15-49	**11.5**	**0.7**	**87.8**	**5411**	**30.2**	**0.1**	**69.7**	**1887**

Source: calculated from 1996 TDHS

It is evident from Table 56 that a majority of the currently married women know at least one modern method. This is true even for women, who never attended formal schooling, and those residing in rural areas. However, only women with traditional beliefs or no beliefs at all do not follow the same trend. A very large minority of these women (35.4 percent) has never heard of any contraceptive method. This is not surprising as this sub-group of women is likely to have a combination of the factors (e.g. reside in rural areas, and have little or no education). Therefore, they are disadvantaged in terms of gaining modern ideas.

The results for never married women are mixed. Although the percentages are lower than those for currently married women, in many categories a majority of unmarried women knows at least one contraceptive method. However, there are two categories in which the majority of never married women do not know any contraceptive method, namely those with no schooling or low levels of schooling and those categorised to have another religion than Catholic, Protestant and Moslem. As an initial step in raising contraceptive prevalence in Tanzania, these groups should be targeted.

6.2.2. *Current Use of Contraception*

Women, who were not pregnant at the time of the interview, were asked if they were currently doing something or using a method to delay or to avoid getting pregnant. This information is very useful as a measure of one of the proximate determinants of fertility as well as a measure of the coverage of family planning programmes (Bertrand et al.,

1993). In order for the results to be comparable with other studies, we computed contraceptive prevalence (the percentage of all women of reproductive age, currently married or living in a union, using some type of contraception), according to their background characteristics. The percentages of current users among never married women were also computed. The results are presented in Table 57.

Table 57 shows that 13.3 percent of the currently married women were using modern contraception at the time of the interview. Among the never married women, only 5.6 percent were using a modern contraceptive method. These rates indicate that the use of contraception is very low in Tanzania. Nevertheless there is a rising trend of contraceptive users as in the 1991/92 TDHS it was estimated to be 6.6 percent for currently married women and 2.6 percent for never married women (Mturi, 1996).

Table 57 further reveals that currently married Tanzanian women residing in urban areas have a contraceptive prevalence of about 17 percentage points higher than those residing in rural areas. However, the difference between urban and rural areas is smaller for never married women (8.4 percentage points). This is due to the tendency of never married women to shy away from attending family planning clinics. Only those who are already mothers can freely attend clinics. It is considered a taboo for a never married woman to attend family planning clinics. The highest contraceptive prevalence (20 percent or more) is observed for those women who had their first sexual intercourse at age 20 or older. Interesting results are shown for those women at the age of 15-19 and 45-49. They have a low contraceptive prevalence. The reason may be that adolescents are newly married, and marriage is looked upon as an institution of producing children as well as they have no access to family planning services. For older women have reduced their coital frequency and most of them rely on other methods like string tie and are afraid to talk about them in an interview. However, a good number of older women might be not sexually active. It is also interesting to note that women who had their first sexual intercourse, marriage and birth below the age of 15 years have a low percentage of contraceptive use. Never married women, who gave birth to their first child when they were younger than 15 years, seem not to use contraceptives at all. This suggests an interaction between not using contraception and early age at birth. On the other hand it reflects the real situation where as family planning services are thought to be for only married women. Hence never married women would shy away even to acknowledge the use of contraceptives.

Table 57: Percentage distribution of women currently using contraceptive methods by selected background variables

	Currently married		*Never married*	
	All	*Non-pregnant*	*All*	*Non-pregnant*
Total (15-49)	13.3	15.3	5.6	5.8
Number of cases	5411	4717	1887	1823
Place of residence				
Urban	26.6	29.5	11.6	12.0
Rural	9.8	11.3	3.2	3.3
Education				
None	5.2	5.9	0.9	1.0
Incomplete primary	13.1	14.8	1.7	1.7
Complete primary	17.9	20.9	7.2	7.6
Secondary +	31.4	35.9	13.1	13.5

	Currently married		*Never married*	
	All	*Non-pregnant*	*All*	*Non-pregnant*
Partner's education				
None	5.3	6.0		
Incomplete primary	9.2	10.3		
Complete primary	14.8	17.5		
Secondary +	29.1	32.0		
Religion				
Moslem	17.0	19.0	7.6	7.9
Catholic	11.9	13.6	6.2	6.4
Protestant	17.4	20.2	4.2	4.3
Other	0.8	1.0	-	-
Polygyny				
Monogamous	14.8	17.1		
Polygamous	9.5	10.8		
Age at first birth				
<15	10.9	11.8	-	-
15-17	14.3	16.1	16.7	17.5
18-19	14.7	16.7	18.1	19.3
20-21	15.9	18.3	16.7	17.6
22-24	14.9	16.5	19.4	21.2
25+	12.8	14.2	-	-
Age at first sexual intercourse				
At union	10.7	12.2	-	-
<15	8.5	9.9	7.3	7.9
15-17	14.5	16.7	13.7	14.9
18-19	15.7	18.2	18.9	19.9
20-21	21.1	24.1	9.4	10.3
22-24	25.8	31.4	-	-
25+	17.2	18.5	-	-
Age at first marriage				
<15	8.7	9.8		
15-17	13.3	15.4		
18-19	13.9	16.1		
20-21	16.6	19.0		
22-24	15.0	17.3		
25+	12.4	13.8		
Current age				
15-19	4.5	5.8	2.4	2.5
20-24	12.7	15.6	12.2	12.9
25-29	14.4	17.0	14.2	15.3
30-34	14.0	15.8	17.6	19.1
35-39	15.9	17.7	6.7	6.7
40-44	17.1	17.7	-	-
45-49	9.2	9.3	-	-

	Currently married		*Never married*	
	All	*Non-pregnant*	*All*	*Non-pregnant*
Children ever born				
None	0.5	0.6	2.9	3.0
1-2	12.5	14.5	14.7	15.6
3-4	16.1	18.3	29.7	32.4
5-6	15.2	17.0	16.7	16.7
7+	14.8	15.9	-	-
Children surviving				
None	0.5	0.7	3.0	3.1
1-2	12.8	14.9	15.7	16.6
3-4	16.3	18.3	33.3	37.0
5-6	15.4	16.9	-	-
7+	16.0	17.3	-	-
Children dead				
None	14.1	16.3	5.3	5.4
1	12.5	14.5	15.0	17.3
2	10.9	12.3	33.3	33.3
3	10.4	11.2	-	-
4+	13.9	14.7	-	-

Source: calculated from 1996 TDHS

Never married women display a different pattern of contraceptive use. Among never married women, the highest contraceptive prevalence is observed for women who had their first sexual intercourse and first birth above the age of fifteen and those who gave birth to more than one child. Surprising enough are those who had their first birth and intercourse below 15 years. Their contraceptive prevalence is very low although they were expected to have more prevalence than others as they started sexual activities earlier. Due to the experience of very early and potentially difficult motherhood, they are expected to contracept more than those who started sexual relationships and motherhood later. However, this might reflect the interaction between early child bearing and none usage of contraception as low contraceptive prevalence leads to earlier birth. Somehow the expectation was that the early motherhood prompts them to prevent or space births in the future. However, these expectations could not be verified.

Let us take a look at women's educational level, which is cited as the most important variable associated with contraceptive use in many countries. It has been observed that better educated women are more likely to use contraception (Rutenberg et al., 1991; Robey et al., 1992; Bertrand et al., 1993). The Tanzanian situation reflects this pattern. The percentage of currently married women using contraception increases consistently

with the level of education. The gap between users who attended at least secondary school and those who never attended any type of schooling is enormous (26 percentage points). This is also true when the education of their partners is considered.

The extent of the use of contraception for currently married women, does not vary much between Moslems and Protestants. In the category 'never married' women, Moslems have the highest contraceptive use followed by Catholics. Protestant women, who are currently married, are more likely to use contraceptives than other currently married women, while Protestant never married women are less likely to use contraception than Moslem and Catholic never married women. Whether married or not, women who declared themselves not to belong to one of these three religions are less likely to use contraceptives than other women.[28] In traditional African societies, people believe that God has control over the human reproductive system or that children are a gift from God. Therefore, no one should prevent a child from coming into the world (Omari, 1989). Most women with traditional faiths are likely to advocate this ideology. Omari (1989) too has argued that Tanzanian women who follow traditional belief systems are less likely to use contraception than other women.

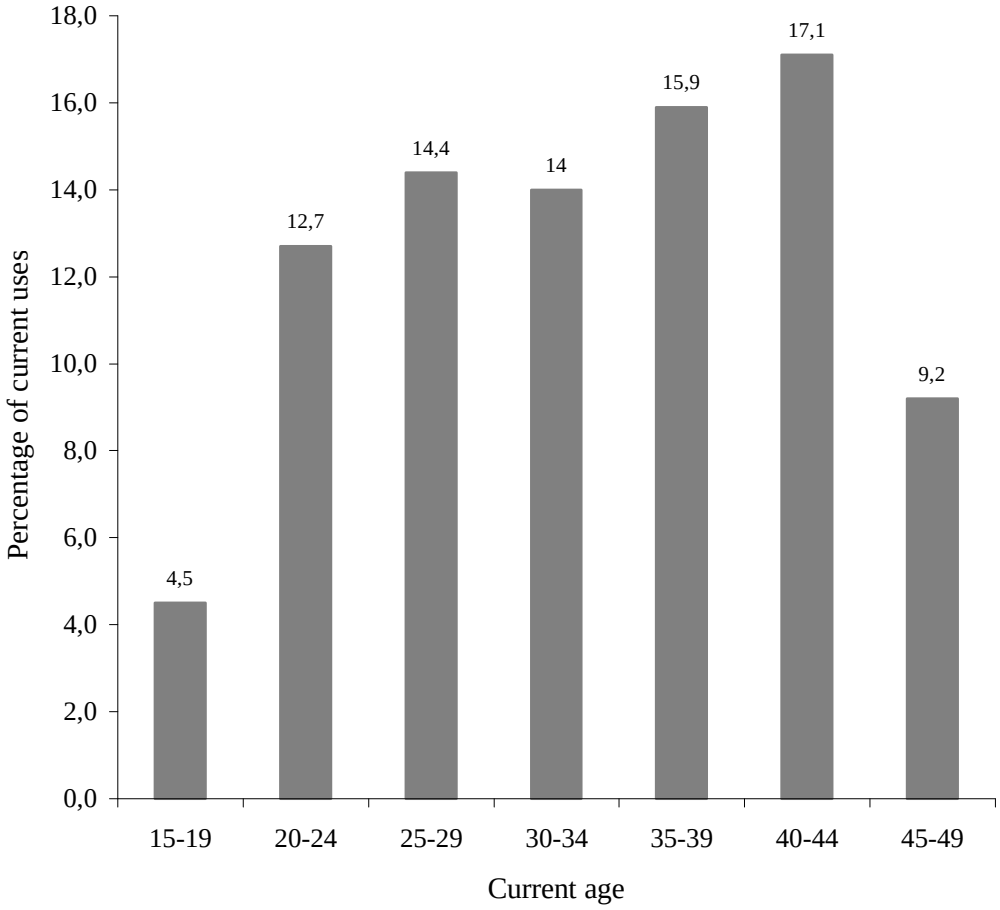
Women bound in a polygamous marriage are less likely to use contraceptives than women who live in monogamous marriages. A lower frequency of intercourse for women in polygamous marriages can discourage them from using contraception. Also, these women are likely to adhere to traditional values and customs that encourage large families. Judging from the Table 57, it seems that contraceptive use does not directly relate to ages at first birth, intercourse, and marriage.

Contraceptive use is higher among currently married women aged 40-44 years than among women either younger or older than that. Figure 22 presents the contraceptive prevalence by five-year age groups of women. The shape is approximately an inverted U-shape. Contraceptive prevalence is lowest for the age group 15-19, increases gradually to reach a maximum at the age group 30-34, after which it decreases consistently to the age group 45-49. This pattern has been found almost everywhere in

[28] This is due to a lack of knowledge caused by little or no education and the fact that these women are residing in rural areas.

sub-Saharan Africa (Rutenberg et al., 1991; Robey et al., 1992; Bertrand et al., 1993; Curtis and Neitzel, 1996).

Figure 22: Percentage distribution of currently married women using contraception by current age



Source: calculated from 1996 TDHS

Finally, it is important to examine the association between the number of children ever born to a woman and contraceptive use. The number of children ever born to a woman has been found to be associated with the use of contraception (Rutenberg et al., 1991; Robey et al., 1992). The TDHS data show that the percentage of women who never had a live birth and who are using contraception is very small (particularly for currently married women). Among currently married women with at least one live birth, the extent of use varies much with the number of children ever born. The use of contraceptives increases with the increasing number of children ever born. The percentage of never married women with no live birth using contraception is 2.9

percent, 14.7 percent for those having 1 to 2 children, and 29.7 percent for those having 3 to 4 children. Those who had 7 children stated not to use contraceptives due to the fact that they are either not currently married, have no regular partners, or have reached menopause (44-49 years).

Table 58: Contraceptive prevalence in sub-Saharan Africa (currently married women 15-49 who know and use any modern method in percentage) and other selected developing countries

Country	*Year*	*Knowledge*	*Use*	
			All	*Non-pregnant*
Benin	1996	76.2	3.4	4.0
Central African Republic	1994	68.6	3.2	3.8
Comores	1996	98.1	11.4	12.8
Côte d'Ivoire	1994	71.5	4.3	5.0
Ghana	1993	90.7	10.1	11.4
Kenya	1993	96.9	27.3	30.8
Mali	1995	64.6	4.5	5.3
Tanzania	**1996**	**87.7**	**13.3**	**15.3**
Uganda	1995	91.6	7.8	9.6
Zambia	1996	97.7	14.4	17.2
Zimbabwe	1994	98.5	42.2	48.0
Egypt -*North Africa*	1995	99.8	45.5	50.9
Bangladesh-*Asia*	1996	99.8	36.2	39.7
Brazil – *South America*	1996	99.9	70.3	74.3
Dominican Republic – *Latin America*	1996	99.7	59.2	65.2

Source: calculated from DHS III

The DHS-III surveys included only eleven countries in sub-Saharan Africa (Table 58), other countries are representatives of their regions. In all countries analysed, nearly all currently married women know at least one modern method of contraception. A high degree of awareness of at least one modern method is observed in all countries in sub-Saharan Africa except Mali, Central African Republic, and Côte d'Ivoire, where such knowledge is less prevalent. In these three countries more than 25 percent of currently married women admited that they are unaware of any modern method of contraception. Contraceptive use follows the same trend. Since women in these countries are to have low knowledge of contraceptives (below 75 percent), the percentage of women who use contraceptives is below 5 percent. This type of measurement is a crude measure as the denominator includes those women who are not at risk of becoming pregnant (already pregnant). We tried to refine our denominator by eliminating those women who acknowledged that they are pregnant. After refining our denominator, the percentages of

contraceptive users changed. The percentage of non-pregnant married women using contraceptives in Benin, Central African Republic was still under 5 percent of all married non pregnant women. However a good number of women in these countries are believed to sterile.

In sub-Saharan Africa the percentage of non-pregnant married women who use a modern contraceptive method ranges from 4 percent in Benin and the Central African Republic to 31 percent in Kenya and 48 percent in Zimbabwe. Kenya and Zimbabwe are countries with exceptionally high contraceptive prevalence in sub-Saharan Africa as most of the countries in this region have less than 20 percent contraceptive prevalence of all non-pregnant married women contracepting. Countries on other continents have more than 50 percent of non-pregnant women using contraceptives, for example Egypt (51 percent), the Dominican Republic (65 percent), and Brazil (74 percent). In general contraceptive use is still very low in sub-Saharan Africa.

6.2.3. *Contraceptive Method Mix*

It is important to examine the specific contraceptive methods used, since different methods have different implications for family planning programmes. In Tanzania family planning services are provided free of charge (except for selected methods in some private clinics). Therefore, the financial costs of contraceptives are unlikely to be a deterrent to the use of contraceptives for Tanzanian women. The major constraints for women who know and want to use a modern method are perhaps the high transport costs and the lack of facilities in clinics.

Table 59 presents the percentage distribution of women using contraception at the time of the interview according to the method they used and their marital status. Tanzanian women use modern methods more frequently than traditional methods. The pill is the most popular method for married women followed by injection. For singles the situation is different. Although the pill is the most popular, it is followed by periodic abstinence. For widowed women all three methods i.e. pill, injection, and condom are popular. In general, the pill is most popular followed by injection. The main reason for choosing the pill as the major contraceptive method for most women might be due to the history of contraceptives in Tanzania. Pills were the first contraception method introduced in

Tanzania. It is interesting to note that family planning is nicknamed '*kidonge/majira*' which means 'pill'. 'Pill' is used as an overall-term to refer to any kind of contraceptive. One cannot be sure which method a woman uses if she speaks of using pills. The use of condoms has serious implications since nowadays it is almost exclusively associated with HIV/AIDS. People do not consider it a 'normal' method of contraception unless somebody is afraid of being infected with HIV. The association with HIV/AIDS causes couples not to use them in order not to imply that the partner is not reliable in terms of sexual fidelity.

Table 59: Percentage distribution of women currently using a contraceptive method according to the methods used and marital status

	Never married	*Married*	*Widowed*	*Divorced*	*Not living together*	*In total*
Number of Women	157	997	50	72	30	1,306
Pill	29.3	29.9	14.0	34.7	40.0	29.7
IUD	1.9	3.2	6.0	2.8	3.3	3.1
Injections	12.7	24.2	20.0	25.0	30.0	22.8
Diaphragm/Foam/Jelly	0.6					0.1
Condom	22.9	4.5	20.0	15.3	10.0	8.0
Female Sterilisation		10.1	20.0	6.9	3.3	9.0
Male Sterilisation		0.1				0.1
Norplant		0.2		1.4		0.2
Modern methods	**67.5**	**72.2**	**80.0**	**86.1**	**86.7**	**73.0**
Periodic Abstinence	28.0	11.1	14.0	5.6	6.7	12.9
Withdrawal	3.2	14.2	2.0	4.2	3.3	11.6
Other	0.6	0.4	4.0	1.4		0.6
Strings	0.6	1.0		2.8		1.0
Herbs		1.0			3.3	0.8
Traditional methods	**32.5**	**27.8**	**20.0**	**13.9**	**13.3**	**27.0**
Sum of percentages	100	100	100	100	100	100

Source: calculated from 1996 TDHS

It has also been noted that the availability and promotion of the pill has much to do with its popularity in many countries (Bulatao, 1989). Injection proves to be popular due to the fact that they can be used without the agreement of the husband or partner. Many men do not want their sexual partners to use any contraceptive methods especially in rural areas. Men would like many children as a future labour force or future social security. The other hidden reason for men to dislike modern contraceptives might be due to culture that permits men to have sexual activities outside their marriage as long as their wives are either pregnant or breastfeeding. During that time, and only then, they can engage in sexual relationships with other women. In many of the various cultures in

Tanzania, men have an interest in keeping their wives either pregnant or breastfeeding since they want to keep their privilege of having sexual partners outside their marriage. Therefore, they do not to accept modern contraception, which implicitly restricts their sexual freedom or give some sexual freedom to their women.

A married woman usually does not have sexual intercourse with another man for the fear of having a child that is not her husband's. This could lead to divorce. In this sense, men believe that contraceptive use is a warrant for women to commit adultery, and are therefore against it. For these reasons injections are now popular to countercheck these cultural factors as a husband would not know if a woman were using contraceptives. The convenience of injections will in future make them popular since instead of taking a pill every day it is convenient for a woman to get an injection once in three months.

Many people in Tanzania dislike barrier methods, especially condoms, because they are considered to reduce sexual pleasure. However, as an HIV-preventive measure condoms are highly used nowadays. As explained earlier, the use of condoms among married couples is very low due to the implication of HIV/AIDS protection. This can be seen in Table 59 where the percentage of condom users among married women is very low compared to widows, divorcees and singles. Widows, divorcees and singles use condoms much more. The result for divorcees is interesting in a way. In the Wanyambo tradition [29], for example, divorce has a different meaning than in other cultural contexts. Culturally, the divorcee remains the wife of the former husband unless she is remarried to another man. In fact, divorce means temporary separation after which the couple could reunite even years later. Hence, divorcees are regarded by society as married women. The use of condoms could lead us to draw a conclusion that the Wanyambo traditions might be universal to many Tanzanian. It shows that although divorcees are not allowed by the society to be sexually active, in reality they are. From this fact divorcees may shy away to visit family planning clinics. Then the concept of family planning services to be provided for only married women is a misleading concept.

Most staff members in the MCH/FP and UMATI clinics follow the unwritten rule that family planning advice can only be given to married clients with a child. This situation reflects the opinion voiced by politicians and religious leaders, that family planning

should be used for family spacing only not for delaying the first birth or preventing premarital births. Therefore mainly married women with at least one child have easier access to contraceptives. This situation might be changing gradually. But it is still awkward for an unmarried schoolgirl, for instance, to visit a family planning clinic. It is therefore convenient for them to use traditional methods that do not require them to go to clinics. Unmarried women with the courage to go to a clinic, or with other means of getting contraception (for example sending a person to obtain contraception on their behalf), prefer the condom because of its 'non-clinical' nature. The other reason for the condom being the most popular modern method among singles has to do with the protection it offers against sexually transmitted diseases such as HIV/AIDS (Mpangile et al., 1993). This is particularly important since never married women are likely to have multiple partners or may change their partners after a short period.

6.2.4. Multivariate Analysis of the Determinants of Current Contraceptive Use

Binary logistic regression is the multivariate analysis technique used to predict the presence or absence of a characteristic or outcome based on values of a set of predictor variables. It is similar to linear regression model but it is suited to models where the dependent variables are dichotomous. In this chapter, logistic regression will be used to examine the relative importance of the determinants of contraceptive use. The response variable is use or non-use of contraceptives at the time of the survey. Women, who were currently pregnant, or who were unsure about being pregnant, were excluded from the analysis. Table 57 describes the data used for the multivariate analysis (in the columns labelled 'non-pregnant') for currently married women and never married women. Women for whom some information on the explanatory variables is missing were dropped from the analysis. The final sample for currently married women includes 4673 women, and for never married women the sample is 1834. That is 1.2 percent of currently married women who were not pregnant had some missing information on at least one of the explanatory variables and hence were excluded from the multivariate analysis. The analysis of ever-married women produced results similar to that for

[29] Wanyambo is a tribe in Karagwe district in the Kagera region.

currently married women. Therefore the results are presented only for currently married and never married women.

6.2.4.1. Results for Currently Married Women

Table 59 presents the model for the determinants of current contraceptive use for women currently married or living with a partner. Six variables were found to influence the use of contraceptives significantly after keeping the other explanatory variables constant. The analysis indicates that women's education is the strongest predictor of the use of contraceptives in Tanzania. Women with 'incomplete primary' education were 2 times more likely to use contraceptives than women who had never attended school. The likelihood of using contraceptives increases further as the educational level increases beyond 'lower primary'. Women, who had at least some secondary school education, were 3.37 times more likely to use contraceptives than women without schooling. It is interesting to note that the education of a woman's partner also has a significant effect independently of her own educational level. The direction of this effect is the same, although the odds ratio is weaker. The fact that both the education of women and of their partners were significant indicates that these two variables have separate effects in determining contraceptive use.

Protestant women are 1.1 times more likely to use contraceptives than Moslem women but the difference is not significant. However, Catholic women are 1.6 times less likely to use contraceptives than Moslems (*1/0.64*); the difference is significant. The odds ratio of religious groups other than three dominant groups is negligible although significant. This means that they are 11 times less likely to use contraceptives than Moslems. In general Moslems are more likely to use contraceptives than any other religious group in Tanzania.

The prevalence of contraception depends to a large extent on the type of the place of residence. Tanzanian women residing in rural areas are 2.4 times less likely to use contraception than their counterparts residing in urban areas. However, other studies in sub-Saharan African countries had different findings. Brass and Jolly (1993), for example, found that Kenyan women residing in urban centres are less likely to use contraception than women residing in rural areas (after controlling for other factors). They argue that once other variables that are known to influence contraceptive use are

controlled, 'there is nothing about urbanisation itself that is significant in increasing contraceptive use and in fact it can be a negative influence' (Brass and Jolly, 1993: 160). Furthermore, in a multivariate analysis for the pooled WFS and DHS data for Kenya, Ghana, Senegal, and Sudan, Bertrand et al. (1993) found that living in a major city had little or no direct effect on the knowledge of at least one modern method and on modern contraceptive use.

The analysis also suggests that the number of living children influence the use of contraception. Women with 1 to 2 children are 28.7 times more likely to use contraceptives than women without surviving children. The odds ratio increases with an increasing number of surviving children. Women with 7 and more surviving children are 58.67 times more likely to use contraceptives than women without any surviving child. Women with 1 or 2 children were less likely to use contraception, while the chance of using a method increased as a woman's family becomes bigger than 3 children.

Table 60: Odds ratio associated with the determinants of current contraceptive use for currently married women

Variable	*Odds Ratio*	*95% Confidence Interval*	
Education			
None	1.00		
Primary incomplete	2.00***	1.470	2.713
Primary complete	3.13***	2.369	4.144
Secondary and above	3.37***	2.185	5.203
Partner Education			
None	1.0		
Incomplete primary	1.14	.809	1.619
Complete primary	1.89***	1.367	2.606
Secondary +	2.93***	2.048	4.197
Polygyny			
Monogamous	1.0		
Polygamous	.77**	.621	.949
Place of residence			
Urban	1.0		
Rural	.42***	.342	.505
Religion			
Moslem	1.0		
Catholic	.64***	.515	.797
Protestant	1.07	.866	1.329

Variable	*Odds Ratio*	*95% Confidence Interval*	
Other/none	.09***	.039	.214
Children ever born			
None	1.0		
1-2	.90	.035	23.293
3-4	1.05	.039	28.467
5-6	1.30	.046	36.842
7+	1.50	.049	45.587
Children surviving			
None	1.0		
1-2	28.70**	1.432	575.432
3-4	40.01**	1.904	840.982
5-6	40.21**	1.822	887.686
7+	58.67**	2.522	1364.720
Children loss			
None	1.0		
1	.88	.681	1.136
2	.89	.580	1.350
3	1.08	.600	1.927
4+	1.61	.790	3.262
Constant	-2.62***		

*** Highly significant at level .001
** Significant at level .01
* Significant at level .05
Source: calculated from 1996 TDHS

Although age at first birth did not show any significance (Table 61), age at first intercourse, age at first marriage, and current age are highly related to contraceptive use. Women who had the first sexual experience after attaining age 15 to 17 were 1.5 times more likely to use contraceptives than those who had the same experience below age 15. The odds ratio increases as the age at first intercourse rises. Women who got married between age 15 and 17 were 1.6 times more likely to use contraceptives than those who were married before attaining age 15. The odds ratio increases as the age at first marriage rises. This shows that women who experience sexual intercourse or marry at an early age do not do something to plan their families. This was also found in bivariate analysis. Otherwise, they lack information on modern contraceptives as Table 56 shows. Modern contraceptive awareness increases with rising age at first intercourse, marriage, and birth. At the same time, knowledge of traditional methods of contraceptives decreases with increasing age at first intercourse, marriage, and birth. This means that adolescents should be given information about contraception at an early age.

Table 61: Odds ratio associated with the retrospective determinants of current contraceptive use for never and currently married women

Variable	*Currently married*	*Never married*
Current age		
15-19		
20-24	2.25**	6.67***
25-29	2.29**	8.24***
30-34	2.14**	14.99***
35-39	2.61***	2.82
40-44	2.59***	0.00
45-49	1.30	0.00
Age at first intercourse		
<15		
15-17	1.45**	1.32
18-19	1.59**	1.92
20-21	2.40***	0.47
22-24	3.18***	0.00
25+	1.13	0.00
Age at first marriage		
<15		
15-17	1.59**	
18-19	1.74**	
20-21	2.24***	
22-24	2.04**	
25+	1.51	
Age at first birth		
<15		
15-17	1.09	5493.83
18-19	0.96	3101.47
20-21	0.86	2289.16
22-24	0.69	3567.88
25+	0.71	0.91

*** Highly significant at level .001
** Significant at level .01
* Significant at level .05
Source: calculated from 1996 TDHS

6.2.4.2. Results for never married women

The logistic regression model for the determinants of contraceptive use obtained for never married women is presented in Table 62. All the variables found to influence contraceptive use for currently married women also influence it for never married women. The only exceptions are variables referring to the partner's characteristics (which are, of course, not observed for never married women). In addition, a woman's

age is an important determinant of contraceptive use for never married women. It seems that unmarried women are more likely to use contraception as they become older. Moreover, the relationship is non-linear. After age 35, the relationship is not significant, but never married women aged between 30 to 34 are 15 times more likely to use contraceptives than adolescents who are not married yet. However, the majority (more than 90 percent) of these women (35 years) are aware of family planning methods (Table 57) but the sample size is too small to have meaningful regression results.

Table 62: Odds ratio associated with the determinants of current contraceptive use for never married women

Variable	*Odds ratio*	*95% Confidence Interval*	
Education			
None	1.0		
Primary incomplete	1.72	.362	8.167
Complete primary	4.59*	1.093	19.314
Secondary +	9.34**	2.097	41.560
Place of residence			
Urban	1.0		
Rural	.36***	.229	.568
Religion			
Moslem	1.0		
Catholic	.65	.393	1.071
Protestant	.44**	.247	.781
Other/none	.003	.000	46688.004
Children ever born			
None	1.0		
1-2	5.39	.724	40.054
3-4	6.91	.117	409.499
5-6	16.68	.051	5420.387
7+	18.83	.000	20.000
Children surviving			
None	1.0		
1-2	1.11	.155	7.916
3-4	2.80	.055	143.848
5-6	.00	.000	5.375E+37
7+	.00	.000	4.695E+88
Child loss			
None	1.0		
1	1.01	.265	3.856
2	4.14	.112	153.526
Constant		-5.36	

*** Highly significant at level .001
** Significant at level .01
* Significant at level .05
Source: calculated from 1996 TDHS

The number of living children is a very strong predictor of contraceptive use for never married women. Women with 1 or 2 living children are 8 times more likely to use a family planning method than women without a living child. Women with 3 to 4 children are 144 times more likely to use contraceptives than singles without any child surviving. Women with seven or more children are $4.7e^{88}$ more likely to use contraceptive than singles without any surviving child. Urban women use contraception more frequently than rural women. Rural singles are 2.8 times (1/0.36) less likely to use a contraceptive than urban never married women; the relationship is statistically significant. A never married woman needs to have at least secondary education in order to be significantly more likely (9.34 times) to use contraceptives than a woman with no schooling. The results for women's religion show that Moslems use contraceptives more frequently than believers of any other denomination. While Catholic singles are 1.5 less likely to use contraceptives than Moslems, Protestants are 2.3 less likely to use contraceptives than Moslems. Non-believers are 333 times less likely to practice contraception than Moslem singles.

6.3. Unmet need for Contraception

It has been shown (see 6.1) that the majority of women in Tanzania know at least one modern method of family planning but very few actually use any method. This situation can arise in many ways as seen in Table 58. Among the issues that have received attention in the literature is what is called the 'unmet need' for contraception (Mturi, 1996). That is the proportion of women who are exposed to the risk of pregnancy but are not using contraception despite the fact that they want to limit or space births.[30] The proportion of women with unmet need along with the proportion of women currently using contraception provide information on the magnitude of the potential demand for contraceptives and family planning services. Therefore, it is important for family planning programmes to utilise the information about unmet need so as to understand the specific needs of women in their reproductive years.

[30] include women who are currently pregnant who did not intended to be pregnant at the time thay became pregnant.

Women with an unmet need for family planning are classified into two groups: those who would like to postpone the next birth (spacing) and those who would not like to have further children (limiting). The unmet need for limiting births refers to women who state that they do not want any more births. Women who state that they want another birth in a period exceeding two years are considered to have unmet need for spacing if they do not use any contraceptive method. The definition of unmet need for contraception has been expanded recently to include pregnant and amenorrheic women, who became unintentionally pregnant because they had been unable to use contraception (Westoff, 1988; Westoff and Ochoa, 1991; Westoff and Moreno, 1992). If a pregnant or amenorrheic woman states that her current pregnancy or the pregnancy for her most recent birth was not intended, it means that access to contraception could have delayed or prevented that pregnancy. Thus the woman had unmet need for limiting births if she wanted no more births, or unmet need for spacing births if she wanted to postpone her next birth.

This section will estimate the magnitude of unmet need for contraception in Tanzania by using the 1996 TDHS data. The demographic and social variables associated with unmet needs for contraception will be examined using bivariate analysis as well as multivariate. Finally, the estimates of the total demand for family planning will be obtained by adding the proportion of women with an unmet need for contraception to the proportion of current contraceptive users. The analysis in this section will help to determine the actual and potential demand for family planning services in Tanzania.

As already said, women have an unmet need for contraception if they are not using a contraceptive method but are capable of conceiving, are exposed to the risk of pregnancy, and wish to avoid or to postpone pregnancy. Therefore, women currently using some form of contraception or being sterilised are assumed to have no further need. Dixon-Mueller and Germain (1992) have identified three groups of current users who can be said to have an unmet need: women who definitely want to avoid or postpone pregnancy but who are using an ineffective method; women who definitely want to avoid or postpone pregnancy but are using a theoretically effective method incorrectly or sporadically; and women who regardless of their reproductive intentions are using a method that is unsafe or unsuitable for them. However, the effect of including the latter two groups of women in the overall estimate of unmet need is

minimal, particularly if the contraceptive prevalence of the country under investigation is low. No attempt is made in this analysis to include any of the current users in the unmet group.

Women not using contraception are classified into two categories: pregnant or amenorrheic, and not pregnant or amenorrheic. For current pregnancy status, the TDHS asked: 'Are you pregnant now?' The respondents were supposed to give one of the three answers, 'yes', 'no' or 'unsure'. Only those who answered 'yes' are regarded as pregnant at the time of the interview. Pregnant women are further classified according to whether or not their current pregnancy was intended. The question which is used in this classification is: 'At the time you became pregnant, did you want to become pregnant then, did you want to wait until later, or did you not want to become pregnant at all?' The responses to this question give the fraction of pregnant women who were unintentionally pregnant. If the pregnancy had occurred earlier than desired then it is unmet need for spacing births and if pregnancy was not wanted at all it is unmet need for limiting births. The major problem about the current pregnancy status classification is that many women in the early months of gestation do not know whether or not they are pregnant.

Currently amenorrheic women were identified by the response to the question 'Has your period returned since the birth of (*name*)?' where *name* refers to the latest child. Women who answered 'no' are considered amenorrheic and classified according to the intention of their most recent pregnancy. Amenorrheic women who would have wanted to postpone their last child for two or more years are considered to have an unmet need for spacing and those who stated they did not wanted another child are considered to have an unmet need for limiting. Currently pregnant or amenorrheic women, whose pregnancy was intended at the time at which it happened, are excluded from the unmet need group.

Women who were neither pregnant nor amenorrheic are classified separately. The first thing is to distinguish the fecund from the infecund. Non-pregnant women who have

been in a union for at least five years (without using contraception)[31] and who have not had a child are classified as infecund. The infecund group also includes non-pregnant women who have not menstruated in the past twelve weeks. Infecund women are excluded from the unmet need category. All women who have had a child in the last five years or who have not had a child but who have been married for fewer than five years are assumed to be fecund. We then classify fecund women who are not using contraception according to their reproductive intentions. Women who report wanting to postpone the next birth by at least two years from the time of the interview are considered to have an unmet need for spacing, and those who report wanting no more births at all are considered to have an unmet need for limiting. Women who want another births soon are excluded from the unmet need group.

In this analysis, we assume that all currently married women who are not pregnant or amenorrheic but who are fecund are sexually active. It is possible that the levels of unmet need are slightly over-estimated as some of these women are not actually sexually active. One way of solving this problem is to exclude all women who stated that they were sexually inactive from the unmet need group. But the reliability of data on sexually activity has been questioned (Westoff, 1988). Finally it is possible to combine all women with an unmet need for spacing with those with an unmet need for limiting; these women together form the overall estimate of unmet need for contraception in Tanzania.

6.3.1. *Estimates of Unmet Need and Demand for Contraception*

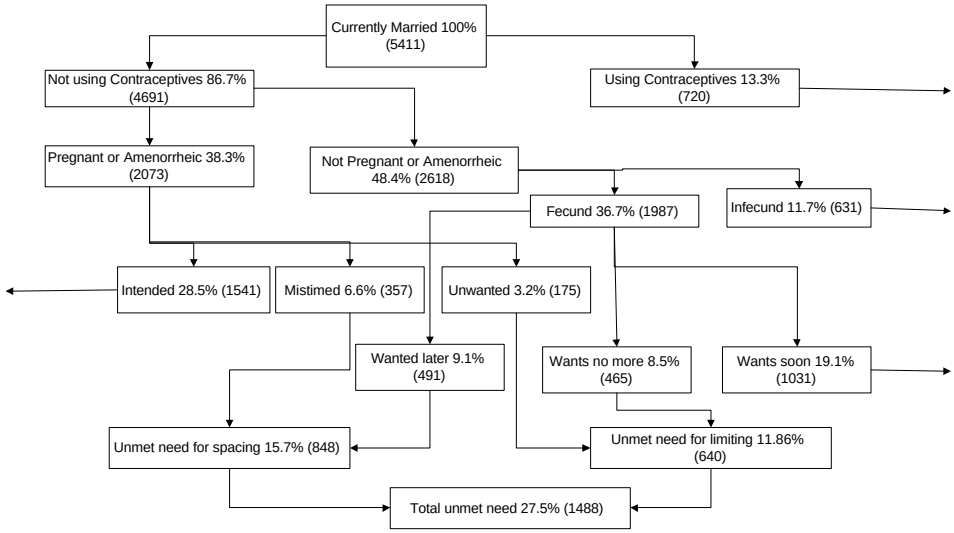
The 1996 TDHS included 5411 currently married women of reproductive age (15-49 years). These women were used as a denominator in the calculations of unmet need. Figure 23 shows the distribution of currently married women according to the components of unmet need for family planning. The figure shows that 72.5 percent of currently married women were considered not to be having an unmet need of contraception due to the following facts:

[31] Data on the timing of contraceptive use was not collected in the 1996 TDHS. Since contraceptive prevalence is still very low in Tanzania, we assume all ever-users of contraception have used a method in the five years prior to the interview date.

(i) they are currently using contraceptive methods: 13.3 percent,
(ii) they are infecund women: 11.7 percent,
(iii) their current or most recent pregnancy was intended: 28.5 percent,
(iv) they want a child soon: 19.1 percent.

The total unmet need for family planning among currently married women in Tanzania is 27.5 percent of which 15.7 percent have unmet need for spacing births and 11.8 percent want to limit births. These results are expected as spacing is the predominant family planning concern in sub-Saharan Africa. DHS data from other African countries have shown that estimates of unmet need range from 22 percent (Zimbabwe) to 40 percent (Togo), and that in all countries the unmet need for spacing exceeds that for limiting by a considerable margin (Westoff and Ochoa, 1991; Westoff and Moreno, 1992).

Figure 23: Estimates of unmet need for family planning



6.3.2. Socio-demographic Differentials in Unmet Need for Family Planning

Several variables have been noted to be associated with unmet need for contraception. Among the commonly mentioned covariates in the literature are age, education,

religion, the number of children, and place of residence (Westoff and Ochoa, 1991; Westoff and Moreno, 1992). Table 61 shows a list of ten covariates hypothesised to have a relationship with unmet need in Tanzania,[32] along with the percentages of currently married women with an unmet need for spacing, and for limiting. Women who had their first birth below 15 years of age, women who were married for the first time below 15 years of age, women over 35 years of age and women with five or more live births have an unmet need for limiting which is higher than that for spacing. It seems that many of these women have achieved their desired family size which is why they do not want any more children. For all other categories of women, the unmet need for spacing is greater than that for limiting (except for women whose partners have incomplete primary education). This study shows that number of surviving children is a main determining variable.

Table 63: Percentage of currently married women with unmet need for family planning

Characteristics	*Unmet need to*		*Total unmet need*
	Space	*Limit*	
Total	15.7	11.8	27.5
Place of Residence			
Urban	13.2	7.3	20.5
Rural	16.0	8.8	24.8
Education			
None	11.8	10.7	22.5
Incomplete primary	15.3	11.9	27.2
Complete primary	18.3	5.7	23.9
Secondary +	14.4	8.1	22.5
Partner's education			
None	13.2	9.7	23.0
Incomplete primary	12.4	13.1	25.5
Complete primary	18.3	6.3	24.6
Secondary +	13.2	6.8	20.1
Religion			
Moslem	16.2	8.0	24.2
Catholic	15.3	8.9	24.2
Protestant	15.0	7.9	22.9
Other	14.6	10.1	24.7
Polygyny			
Monogamous	15.9	8.0	23.9
Polygamous	14.0	9.6	23.6

[32] The variables used here are similar to those used in the analysis of current users of contraception presented in section 6.2.

Characteristics	*Unmet need to*		*Total unmet need*
	Space	*Limit*	
Age at first birth			
<15	10.5	13.7	24.2
15-17	15.7	10.6	26.2
18-19	18.3	8.0	26.3
20-21	18.5	7.9	26.4
22-24	16.2	9.6	25.8
25 +	11.2	5.2	16.4
Age at first sexual intercourse			
<15	15.3	8.3	23.6
15-17	16.4	8.4	24.7
18-19	17.0	9.1	26.1
20-21	9.8	9.0	18.8
22-24	14.3	2.9	17.1
25 +	14.6	8.7	23.3
Age at first marriage			
<15	11.3	12.7	24.0
15-17	16.3	8.8	25.1
18-19	18.7	7.2	25.9
20-21	14.9	8.6	23.5
22-24	13.7	5.4	19.1
25 +	10.4	5.7	16.1
Current age			
15-19	18.5	1.7	20.2
20-24	22.5	3.5	26.1
25-29	20.5	4.1	24.6
30-34	14.0	8.9	22.9
35-39	11.6	15.3	26.9
40-44	5.3	20.3	25.6
45-49	2.9	12.1	15.1
Surviving children			
None	4.3	0.4	4.6
1-2	19.9	2.9	22.8
3-4	17.8	7.3	25.1
5-6	13.5	15.2	28.7
7+	9.7	24.3	34.0

Source: calculated from 1996 TDHS

The highest levels of total unmet need (over 27.5 percent) are observed for women at the age of 35, and for those having more than 5 surviving children. In order for the sub-group of women with five or more children in Tanzania to decrease in future as a step towards further fertility decline, it is important to put emphasis on assisting these women to avoid unwanted births. One strategy to achieve this would clearly be to reduce the number of women in this category with an unmet need for family planning.

Women in rural areas have a high percentage of unmet need compared to their counterparts in the urban areas. Since Tanzanian family planning services are concentrated in urban areas, there is a great need for disseminating information about family planning. Associated services need to be organised so that they reach women in rural areas. Table 63 further shows that the unmet need is relatively high for women with some formal education. This pattern is very similar to that observed in other African countries which participated in the DHS (Westoff and Ochoa, 1991).

Younger women have a higher unmet need for spacing whereas older women have a higher unmet need for limiting. The levels of unmet need do not vary much in the various religious groups, and types of marriages. Finally, the bivariate analysis shows that women having late marriage, late first birth, and late first sexual intercourse have a lower level of unmet need than their counterparts in early ages. This may be a calendar effect given the time span between those events and the time of the interview.

6.3.3. *Multivariate Analysis of the Determinants of Unmet Need*

The findings presented in Table 63 give the general picture of determinants of unmet need when each covariate is examined by itself. For a better understanding of the determinants of unmet need, it is necessary to look at all covariates hypothesised to affect unmet need in a multivariate perspective. As in the bivariate analysis, it is interesting to examine the determinants of unmet need for spacing separately from the unmet need for limiting. This implies that the response variable has three categories: unmet need for spacing, unmet need for limiting, and no unmet need. The multinomial Logit model is therefore the best statistical technique to apply. However, the coefficients from a multinomial Logit model are expected to be equal to coefficients obtained when performing two binary Logit models with the same reference category for the response variable (Begg and Gray, 1984).

In this analysis two binary Logit models have been fitted. The response variable for the first model has two categories: unmet need for spacing (coded 1) and no unmet need (coded 0). The response variable for the second model has also two categories: unmet need for limiting (coded 1) and no unmet need (coded 0). The ten predictor variables

used are the same in both models. The covariates used are listed in Table 61 along with the categories as introduced in the logistic regression.

The results for the binary logistic models are given in Table 64. The type of place of residence, education of a woman, polygyny, and religion did not influence unmet need in either model. Two variables, age at first marriage, and the number of surviving children were found to be significant in both models, while partner's education had an impact only on the unmet need for limiting. Age at first birth, age at first intercourse, and current age of a woman were found to affect only the unmet need for spacing. Two-way interactions were found to be highly significant.

Table 64: The coefficients of logistic regression models for the determinants of unmet need

Variable	*Space*	*Limit*
Place of Residence		
Urban	RC	
Rural	0.162	-0.094
Education		
None	RC	
Primary incomplete	0.093	0.242
Primary Complete	0.118	-0.102
Secondary +	0.196	0.433
Partner's Education		
None	RC	
Primary incomplete	-0.128	0.108
Primary complete	-0.129	0.068
Secondary +	-0.167	-0.411*
Polygyny		
Monogamous	RC	
Polygamous	0.023	0.059
Religion		
Moslems	RC	
Catholics	-0.138	-0.116
Protestants	-0.194	-0.092
Other	-0.160	-0.112
Age at first birth		
<15	RC	
15-17	0.291	-0.246
18-19	0.415	-0.158
20-21	0.429	0.002
22-24	0.698**	0.222
25 +	0.478	0.019
Age at first intercourse		
<15	RC	

Variable	*Space*	*Limit*
15-17	0.026	0.039
18-19	-0.139	0.302
20-21	-0.520*	0.319
22-24	-0.181	-0.173
25 +	0.073	-0.200
Age at first marriage		
<15	RC	
15-17	0.028	-0.163
18-19	0.303	-0.314
20-21	0.099	-0.248
22-24	0.088	-0.661*
25 +	0.514*	-0.464
Current age		
15-19	RC	
20-24	-0.295	0.273
25-29	-0.807***	-0.351
30-34	-1.499***	-0.076
35-39	-1.873***	0.188
40-44	-2.650***	0.654
45-49	-3.375***	0.139
Surviving children		
None	RC	
1-2	1.296***	1.311
3-4	1.590***	1.940*
5-6	2.053***	2.088*
7+	2.109***	2.235*
Constant	-1.982***	-2.302***

*** Highly significant at level .001
** Significant at level .01
* Significant at level .05
Source: calculated from 1996 TDHS

For a better understanding of the results given in Table 64, it is helpful to construct a multiple classification analysis (MCA) table which shows the probabilities of having an unmet need for spacing, and for limiting. The details of the procedure used to calculate such a table are given in Retherford and Choe (1993) and are reproduced in Chapter 3. The results obtained are presented in Table 65. The probabilities of having an unmet need for spacing and limiting births are estimated for all covariates used in the logistic regression. The probability of having unmet need for spacing is much higher than that for limiting across most of the covariates with nine exceptions; women with 0-7 years of education, women with partners who completed primary education, women who were first married before age 15, women of age 35 and more, and women with more than two living children. It is not surprising to find that women approaching the end of

their child bearing age have a higher probability of having an unmet need for limiting than for spacing (refer also to the bivariate analysis). Currently married women without a living child have negligible probabilities of having any unmet need as most of them want to have a child as soon as possible.

Women residing in rural areas have a higher unmet need for spacing and limiting than those living in urban areas. A woman residing in a rural area has a chance of having unmet need for spacing and limiting 2 percentage points greater than a woman living in an urban. The same pattern of probabilities is observed across educational levels of women. The highest chance of having unmet need for spacing was registered for women in the category 'complete primary schooling' although they had the lowest percentage of unmet need for limiting. Although the probabilities for age at first birth, marriage, and intercourse do not differ by a big margin, they do show a similar trend in so far as women's age at first intercourse, marriage and birth goes up and the probability of having unmet need for either spacing or limiting goes down.

The age of women gives interesting results: In both models, the relationship between age and unmet need is found to be significant and linear. The probability of a woman to have an unmet need for spacing decreases with age while the probability of having unmet need for limiting increases with age. Women aged 15-19 years have the highest levels of unmet need for spacing births (25 percent) as well as the lowest unmet need for limiting births (5 percent). By age 35, the probability of having an unmet need for spacing is reduced to 0.13 percent, and for limiting to 0.17 percent. These results suggest that young women are highly in need of family planning services for spacing. In reality, they are disadvantaged in terms of family planning provision. They either shy away from clinics or they are turned away due to their young age and their marital status as explained earlier.

Table 65: Multiple classification analysis for the estimated percentages having unmet need

Characteristic	*Probability of unmet need for*		*N*
	Spacing	Limiting	
Place of Residence			
Urban	15	10	994
Rural	17	12	3884
Education			
None	13	15	1677
Primary incomplete	15	17	835
Primary Complete	20	7	2176
Secondary +	16	11	191
Partner's Education			
None	15	14	1067
Primary incomplete	13	17	1059
Primary Complete	20	8	2157
Secondary +	14	9	595
Polygyny			
Monogamous	17	11	3471
Polygamous	15	13	1408
Religion			
Moslem	17	12	1520
Catholic	16	12	1489
Protestant	16	11	1194
Other	16	12	675
Age at first birth			
<15	12	19	344
15-17	17	12	1549
18-19	18	10	1413
20-21	17	10	835
22-24	16	11	506
25 +	10	9	232
Age at first intercourse			
<15	17	12	713
15-17	17	11	1734
18-19	17	12	620
20-21	11	11	211
22-24	14	5	60
25 +	16	12	1541
Age at first marriage			
<15	13	17	694
15-17	17	12	1896
18-19	20	10	1048
20-21	16	11	598
22-24	14	8	378
25 +	14	9	264
Current age			
15-19	25	4	223
20-24	24	6	953

Characteristic	*Probability of unmet need for*		*N*
	Spacing	Limiting	
25-29	22	5	1103
30-34	15	10	911
35-39	13	17	705
40-44	7	27	547
45-49	4	20	436
Surviving children			
None	6	1	117
1-2	20	4	1782
3-4	18	10	1434
5-6	14	18	880
7+	10	28	664

*** Highly significant at level .001
** Significant at level .01
* Significant at level .05
Source: calculated from 1996 TDHS

The probability of having unmet need for limiting increases as the number of living children rises. Unmet need for spacing decreases as the number of surviving children increases. Women with 7 and more children have a very high probability of having an unmet need for limiting (0.28), and for spacing (0.1). From the data it seems that after having between 3 and 4 surviving children, a Tanzanian woman finds there are enough and she would like to limit the number of children.

6.3.4. *Total Demand for Family Planning*

As noted earlier, the total demand for family planning is the sum of those women currently using contraception and those with an unmet need. This produces the prevalence rate that would be achieved if all women who need family planning could use a method. Table 66 presents the total demand for family planning along with the percentage of women currently using a method (satisfied demand), and the percentage of women who want either to space or limit their births (unsatisfied demand). Overall, the demand for family planning in Tanzania is 40.8 percent. It seems that the demand for family planning in Tanzania is in line with other sub-Saharan African countries. Westoff and Ochoa (1991) have demonstrated that Kenya, Zimbabwe, and Botswana have the highest demand in the region (over 60 percent), and Mali has the lowest demand (28 percent).

Table 66: Percentage of currently married women according to demand for family planning and background characteristics

Characteristics	*Current users*[33]	*Unmet need*	*Total*[34]
Total	**13.3**	**27.5**	**40.8**
Place of Residence			
Urban	26.6	20.5	47.1
Rural	9.8	24.8	34.6
Education			
None	5.2	22.5	27.7
Incomplete primary	13.1	27.2	40.3
Complete primary	17.9	23.9	41.8
Secondary +	31.4	22.5	53.9
Partner's Education			
None	5.3	23	28.3
Incomplete primary	9.2	25.5	34.7
Complete primary	14.8	24.6	39.4
Secondary +	29.1	20.1	49.2
Religion			
Moslem	17	24.2	41.2
Catholic	11.9	24.2	36.1
Protestant	17.4	22.9	40.3
Other	0.8	24.7	25.5
Polygyny			
Monogamous	14.8	23.9	38.7
Polygamous	9.5	23.6	33.1
Age at first birth			
<15	10.9	24.2	35.1
15-17	14.3	26.2	40.5
18-19	14.7	26.3	41.0
20-21	15.9	26.4	42.3
22-24	14.9	25.8	40.7
25 +	12.8	16.4	29.2
Age at first sexual intercourse			
<15	9.6	23.6	33.2
15-17	14.6	24.7	39.3
18-19	15.8	26.1	41.9
20-21	21.6	18.8	40.4
22-24	22.9	17.1	40
25 +	11.2	23.3	34.5
Age at first marriage			
<15	8.7	24	32.7
15-17	13.3	25.1	38.4
18-19	13.9	25.9	39.8

[33] From Table 57

[34] From Table 63

Characteristics	*Current users*[33]	*Unmet need*	*Total*[34]
20-21	16.6	23.5	40.1
22-24	15	19.1	34.1
25 +	12.4	16.1	28.5
Current age			
15-19	4.5	20.2	24.7
20-24	12.7	26.1	38.8
25-29	14.4	24.6	39
30-34	14	22.9	36.9
35-39	15.9	26.9	42.8
40-44	17.1	25.6	42.7
45-49	9.2	15.1	24.3
Surviving children			
None	0.5	4.6	5.1
1-2	12.8	22.8	35.6
3-4	16.3	25.1	41.4
5-6	15.4	28.7	44.1
7+	16.0	34.0	50.0

Source: adopted from Table 57 and Table 63

Women residing in urban areas, have higher demand than their counterparts residing in rural areas. The demand for family planning increases as the education of the woman or her partner's education rises. It is interesting to note that women with secondary education or above have a demand of more than 26 percentage difference (53.9 percent) by comparison with women without formal education (27.7 percent). There is also a positive relationship between the number of living children and the demand for family planning. The demand is lowest (5.1 percent) for women without a child and highest (50 percent) for women with 7 children.

It can be concluded therefore that the analysis indicates that the type of place of residence, a woman's education, her partner's education and the number of living children a woman has are highly associated with the demand for family planning in the expected direction. The demand for family planning is observed to be highest for Moslems, women in monogamous marriages, women who had their first birth between age 20-21, first sexual intercourse between 18-19, first marriage between age 20-21, and women in the age group 35-39 years.

6.4. Concluding Remarks

Knowledge of contraception is relatively high in Tanzania, particularly among currently married women. The TDHS data show that 88 percent of currently married women know at least one method. However, the level of knowledge is lower for never married women (only 70 percent know at least one method). Whilst almost all sub-groups of currently married women demonstrate a high level of knowledge, a majority of women in some sub-groups of never married women do not know any family planning method. Specifically, unmarried women with no education, and without any living child have low levels of knowledge.

Use of contraception is very low in Tanzania. According to 1996 TDHS data, the percentages of women age 15-49 currently using any method are 13.3 and 5.6 for currently married women and never married women respectively. The percentage of users is as low as 4.5 for some sub-groups of currently married women, and 2.4 for some sub-groups of never married women. It seems that contraception in Tanzania is mainly used for spacing purposes. Methods most widely used are the pill and injections. The common traditional methods are periodic abstinence and withdrawal. It is interesting to note that the percentage of never married women using the pill is somehow equal to those using periodic abstinence. This has been suggested to be a consequence of the lack of services that modern methods require. In most cases, young unmarried women cannot get services from governmental family planning clinics. This prompts these women to choose traditional methods, which are considered to have low use-effectiveness. However, in general the main reasons for not using contraceptives include a need for more children, and opposition by the respondent to contracept.

A multivariate analysis of the determinants of current contraceptive use among non-pregnant women showed that for currently married women, 8 out of 11 variables chosen influenced the use of contraception significantly. Currently married Catholic women residing in rural areas, with no schooling, married to a man with no schooling, involved in a polygamous marriage, or without a living child are less likely to use contraception than other women.

The multivariate analysis for never married women showed that the use of contraceptive is less frequent for those residing in rural areas, with no schooling or incomplete

primary education, and no living child. The variables influencing the use of contraception for never married women were also found to influence currently married women. It is interesting to note that unmarried women are less likely to use contraception as they become older, unlike currently married women who are more likely to contracept as they become older. The association is non-linear. It should be stressed that the majority of never married women were adolescents. A study conducted in Dar es Salaam referral hospital (Muhimbili Medical Centre) found that the majority of illegally induced abortions occurred to young and unmarried women (Justesen et al., 1992).

These women are still not accessible to family planning information and services. This problem needs to be addressed urgently by the National Family Planning Programme because premarital sexuality is very prevalent in Tanzania, and premarital fertility and abortion rates are rising as found in Chapter 4.

The total unmet need is estimated to be 27.5 percent among currently married women. Most of these have an unmet need for spacing births (15.7 percent) rather than for limiting births (11.8 percent). The sum of the unmet need and current contraceptive use (13.3 percent) gives a total demand for contraception of 40.8 percent. It seems, therefore, that Tanzania has a significant demand for family planning according to sub-Saharan African standards.

Chapter 7

7. Early Motherhood, Contraceptive Awareness and Use among Adolescents

7.1. Introduction

Adolescents broadly defined, as the young population aged 10-19 years, is a vital population segment, making up 24.2 percent of the Tanzanian population (1988 census). Adolescence is an important period in any human being's life as this is the time of rapid growth both physically and mentally. Adolescents theoretically believed to be in the child bearing group (15-19 years), amount to 11 percent of all Tanzanian women.[35] This period of adolescence is characterised by high risk for early and unwanted sexual activity, forced marriage, and early pregnancy-related events. The challenge to the policy-makers and to social forces influencing society is to provide adolescents with more control over their lives by either making contraceptives accessible to adolescents, or delay sexual activity, marriage, and child bearing until they are ready and willing.

Adolescent fertility in Tanzania has been ignored for a long time because of the Malthusian assumption that fertility is confined to marriage. Maintaining this assumption means excluding the increasing magnitude of premarital and extramarital fertility as seen in Chapter 4. It should be noted that in Tanzania only 30 percent of ever married women had their first sexual experience within their first marriage. The remaining 70 percent had sexual intercourse prior to their first marriage. The actual level of premarital sexual activity may even be higher than the reported level because single women might feel that it is not acceptable to acknowledge that they are sexually active.

[35] Bureau of Statistics (1992), Population Census, Basic Demographic and Socio-economic characteristics, 7.

However, not all adolescent sexual activity is consensual. Sexual abuse, incest, and rape are troubling realities in developing and developed countries alike. In Uganda, nearly half (49 percent) of all sexually active girls in primary school reported that they were forced to have sexual intercourse. Almost 22 percent anticipate receiving gifts or money in exchange for sex (Waite, and Moore, 1978). In the United States, 7 in 10 women who had sex before age 14, and 6 in 10 who had sex before they reach age 15, report having had sex involuntarily (AGI, 1994).

Child bearing as a crucial period of human development might have serious consequences on these young mothers. It can limit educational attainment, restrict the skills young women acquire for the work force, limit their capacity to support themselves financially, negatively affect their healthy, and reduce their quality of life. As young people postpone marriage to later ages, the likelihood of beginning a sexual relationship prior to marriage increases. Consequently, so does the chance of unintended pregnancy, abortion or birth among unmarried adolescents. Moreover, their families may disown adolescents who gave birth before marriage since virginity is still considered important to a first marriage. Therefore, many are left with the responsibility of raising the children themselves which lead to prostitution among these abandoned adolescents. Besides these problems, schoolgirls are not allowed to continue attending school when they are pregnant. Therefore, many of them perform illegal abortion which can cost their life (Njau and Lema, 1988; Mashalaba, 1989; Meekers, 1990).

The cause of adolescent premarital births have been associated with the declining age at puberty (Chapter 4) that puts adolescent girls at the risk of early premarital exposure to the sexual activities. However, adolescent women who become a parent in adolescents are at greater risk of social and economic disadvantage throughout their lives than those who delay child bearing until their twenties. They are less likely to complete their education, to be employed, to earn high wages, and to be happily married. They are more likely to have larger families especially in a country of low contraceptive prevalence like Tanzania. The ability of young mothers to support themselves and their children is affected by the employment opportunities available to them. These opportunities, in turn, are largely determined by the qualifications that young mothers bring to the market. It seems reasonable to assume that caring for young children will conflict with and possibly reduce a woman's investment of time and effort in primary

school completion, college attendance, post-secondary training, and early work experience. If reductions in these early investments occur, they are likely to have profound, long-term consequences for the earnings and employability of the mother and, hence, for the economic wellbeing of both the mother and her children. It was found in the 1996 TDHS (Chapter 4) that a high proportion of young women (15-19 years) had unplanned births - either not wanted at the time of the birth or not wanted at all (27 percent). Faced with an unplanned pregnancy, some young women may turn to illegal abortion since abortion is prohibited in Tanzania as explained in Chapter 4. For these reasons, it is important to separate adolescents from other groups in the study of child bearing.

Economic hardships, urbanisation, and weakening of traditional structures that informed and regulated young people's sexual behaviour have been associated with adolescent sexual and reproductive health problems. The situation has worsened due to the total lack of a reproductive health education component in the Tanzanian school curriculum. It was thought that such information might encourage promiscuity among adolescents rather than helping them to minimize the consequences of unprotected sex (Kapinga et al., 1992; Leshabari et al., 1997; Lwihula, 1996).

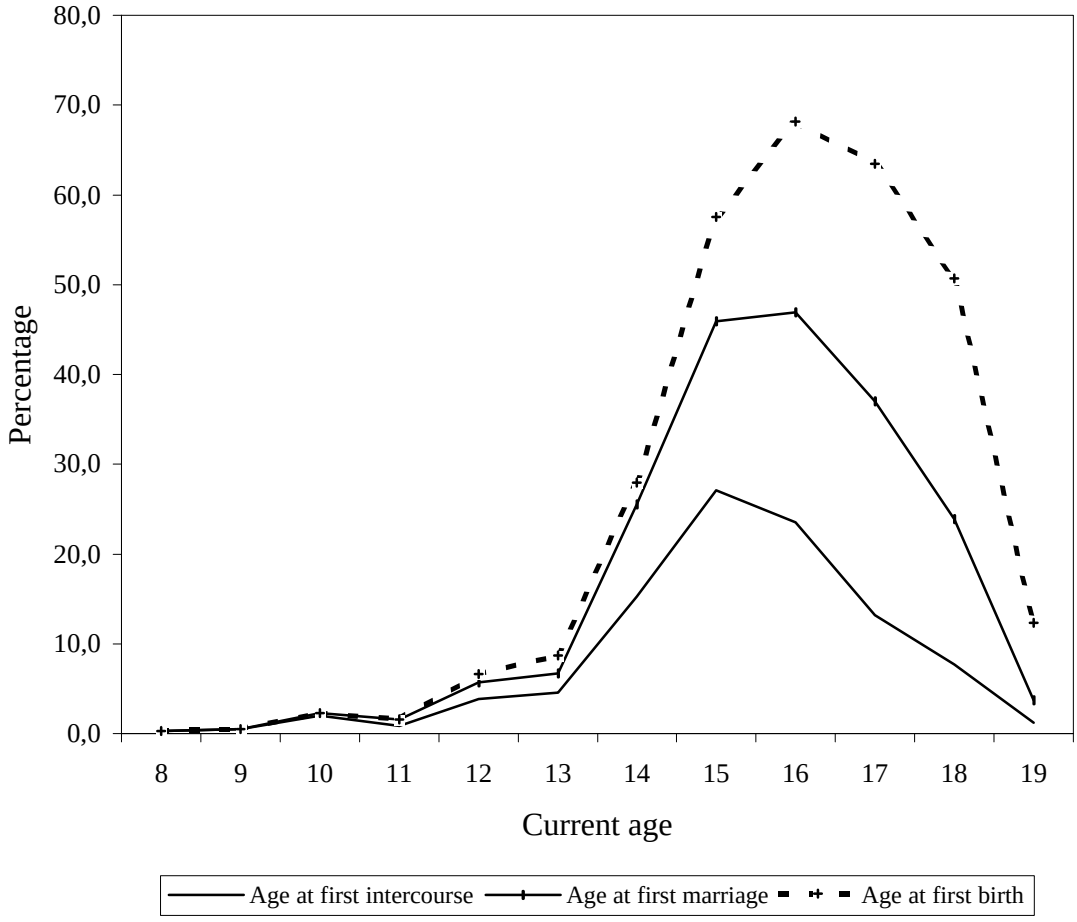
In Tanzania, adolescent women independent of their marital status are generally aware of contraceptive methods but very few use them. For example in the 1996 TDHS (Chapter 6) it was found that 65.4 percent of women at the age of 15-19 have heard of at least one method of family planning, but only 3.1 percent of those who know at least one contraceptive method, use any method. Only 13 percent of women age 20-24 were using efficient contraceptive methods. This indicates that adolescents are aware of modern contraceptive methods but in fact, very few use them. Therefore, in this chapter more emphasis will be on premarital first births and ways to reduce unwanted premarital pregnancies among adolescents.

7.2. Adolescents Child bearing

Adolescents engage in sexual practices early as most of them start sexual intercourse when they are 15, get married at 16 and have their first birth when they are 17 years of age (Figure 24). But if we examine adolescents by using the life table approach, which

is relevant for the evaluation of duration variables like age at first intercourse, marriage and birth, age at first sexual intercourse, marriage and birth go up by .2 years. The main reason for using this approach is that these variables are measured in terms of the time elapsed before a particular event occurred. For example, age at first sexual intercourse is recorded as the time elapsed between the date of birth of an individual female adolescent and the date of the first sexual intercourse. However, for some individuals the time elapsed until the day of the interview may not have been sufficient for the event to have occurred. In these cases the information on duration has been censored by the interview. For censored information, life table methods and the use of current data are found to be the most suitable analytical methods and have been employed for duration analysis in this chapter.

Figure 24: Adolescents' age at first sexual intercourse, marriage and birth in single years



Source: calculated from 1996 TDHS

Table 67: Adolescents' age at first sexual intercourse, marriage and birth

	T10	*T25*	*T50*	*Trimean*	*T75*	*N*
AFSI	12.8	14.2	15.4	15.3	16.5	707
AFM	14.0	15.0	16.2	16.2	17.3	442
AFB	14.8	15.8	16.9	16.8	17.9	361

Sources: AFSI (Age at first sexual intercourse)- Table 17
AFM (Age at first marriage)- Table 21
AFB (Age at first birth)- Table 11

According to Tanzania data, the average age at first sexual intercourse is 15.3 years. The average age at first marriage is 16.2 years. The average age at which adolescents bear their first child in Tanzania is about 16.8 years. By the age of 15, about 10 percent of adolescents had their first live birth and about one-quarter have done so by the time they are 16 years old. In general, it is evident that adolescents are having sexual intercourse before marriage. But most of them have their first birth after marriage and the difference between these three events is one year each between the events. However, the timing of first sexual intercourse, marriage and birth is concentrated between age 15-17.

Table 68: Mean age at first birth by current age in sub-Saharan Africa and selected developing countries

Country	*Year*	*AFSI*	*AFM*	*AFB*
Benin	1996	15.3	16.2	16.9
Central African Republic	1994	14.9	15.1	16.2
Comores	1996	14.2	14.9	15.8
Côte d'Ivoire	1994	14.7	15.4	15.9
Ghana	1993	15.5	16.2	17.1
Kenya	1993	15.1	16.4	16.7
Mali	1995	15.0	15.0	16.2
Tanzania	**1996**	**15.2**	**16.2**	**17.2**
Uganda	1995	14.8	15.5	16.3
Zambia	1996	14.8	16.1	16.6
Zimbabwe	1994	16.2	16.4	16.8
Egypt	1995	-	16.2	16.9
Bangladesh	1996	-	13.9	15.7
Brazil	1996	16.2	17.9	20.4
Dominican Republic	1996	15.1	15.2	16.3

Source: calculated from DHS III

Although Meekers (1993) by using DHS II data found a large variation in the timing of first sexual intercourse in sub-Saharan Africa, this study found a higher uniformity of

mean age at first sexual intercourse in the mid 90s ranging between 14.2 years in Comores and 16.2 years in Zimbabwe. However, most countries' mean age at first sexual intercourse is around 15 years. Every country follows the trend that sexual intercourse on average is first followed by marriage, and later by first birth. But the differences between mean age at first sexual intercourse and first marriage differ to some extent from 0.2 years to 1.3 years for Kenya and Zambia respectively. This indicates that in sub-Saharan Africa, there is a high incidence of premarital sexual activity which leads to premarital births because in most cases these premarital sexual intercourse takes place without effective contraception (not pregnant protected). It is believed that unmarried adolescents in sub-Saharan Africa are more likely to be sexually experienced than are those in Latin America and the Caribbean, and much more likely than those in Asia and Oceania (McCauley and Salter, 1995).

7.3. Socio-economic Factors Associated with Adolescents' Age at first Motherhood

Adolescents in rural areas have a lower mean age at first birth than those in urban areas. But this urban-rural difference might be attributed to many factors, e.g. education. However, it is believed that women's mean age at first birth may be rooted in the behaviour acquired during childhood. It seems that women who grew up in Dar es Salaam had the lowest mean age at first birth. According to Table 63, adolescents who grew up in Dar es Salaam, give birth 0.9 years earlier than those who grew up in regional towns. We expected adolescents who grew up in Dar es Salaam to have the highest mean age at first birth as they live in a more modern environment than others, and have better access to mass media and contraceptives. On the other hand social control might be the lowest in Dar es Salaam.

In the Tanzanian context, the head of a household as a rule is an adult man, no matter if he is the bread earner or not. If there is no adult male resident, a woman might be the head of the household. Female-headed households are usually single-parent households. Adolescents from households headed by females have a lower mean age at first birth than adolescents from male-headed households. This may reflect that adolescents from single parents engage in unprotected sexual activities very early compared to their counterparts from families of married couples. These adolescents try to imitate the

behaviour of their parent since a single parent mother is more likely to have various sexual partners than a married woman.

It can be seen from Table 69 that adolescents with no education have a lower mean age at child bearing than those with complete primary or secondary education. The mean age at child bearing is 0.7 years below the average for the sample of adolescents. On the other hand, completing primary education raises the age at first child bearing by 0.1 years above the sample mean. Attendance of secondary school raises the age at first child bearing by almost one year. This confirms the hypothesis that the higher the level of education, the higher the age at first child bearing. However, the low level of education is not the cause of early child bearing. Rather the coincidence of the two; and usually a characteristic of living in impoverished and rural environments. It seems that adolescents with incomplete primary education have the same mean age at first birth as those who did not go to school. This can be expected since they left school before they reached their menarche. The reason why adolescents who have attended secondary school give first birth later can be easily understood. In Tanzania schools do not allow visible pregnant women or mothers to continue with their education. Furthermore, the possible reason, why those, who have completed primary education, give birth earlier than those with secondary education and above might be due to the absence of occupation or further education after seven years in school. Then most of primary school leavers either get married or engage in unprotected sexual activities that result in early premarital births.

While Protestants' mean age at child bearing is 0.1 years above average (16.8 years), other religious groups have a mean age at first birth below the average. Notably, among them are Moslems with 16.7 years and Catholic adolescents with 17.0 years. Perhaps the high mean age at first child bearing observed among Protestants is due to the fact that most followers of Christian religions spend longer periods in school than Moslems.

Table 69: Socio-economic factors associated with adolescents' age at first child bearing in Tanzania

	T10	*T25*	*T50*	*Trimean*	*T75*	*T90*	*Spread*	*N*
Place of residence								
Urban	15.1	16.1	17.1	17.1	17.9	18.7	1.4	77
Rural	14.7	15.8	16.9	16.9	17.9	18.7	1.4	284
Child Place of residence								
Dar es Salaam	13.9	15.4	16.6	16.6	17.7	18.6	1.7	25
Other Urban	16.0	16.7	17.5	17.5	18.2	18.8	.9	33
Rural	14.8	15.8	16.9	16.9	17.9	18.7	1.4	302
Head of Household								
Male	14.9	15.9	17.0	17.0	17.9	18.7	1.4	302
Female	14.5	15.7	16.9	16.8	17.8	18.6	1.6	58
Education								
None	14.2	15.4	16.5	16.5	17.6	18.5	1.35	96
Primary incomplete	14.4	15.3	16.4	16.4	17.4	18.2	1.4	77
Primary complete	15.3	16.3	17.3	17.3	18.1	18.8	1.3	182
Secondary +	17.1	17.4	18.0	18.0	18.6	18.9	.55	6
Religion								
Moslem	14.7	15.7	16.7	16.7	17.7	18.6	1.4	126
Catholic	15.0	15.9	17.0	17.0	17.9	18.7	1.4	104
Protestant	15.1	16.2	17.3	17.3	18.2	18.8	1.3	92
Other	13.6	15.6	16.6	16.6	17.5	18.3	1.7	36
Marital								
Never married	14.8	15.8	16.9	16.9	17.8	18.6	1.4	101
Married	14.9	15.9	17.0	17.0	18.0	18.8	1.5	231
Widow	-			-				
Divorced	14.4	15.5	16.8	16.7	17.7	-	1.6	18
Not living together	15.0	15.8	17.0	16.9	17.6	18.0	1	10
Polygyny								
Monogamous	14.9	15.8	16.9	16.9	18.0	18.8	1.5	176
Polygamous	14.9	15.9	17.1	17.0	17.9	18.5	1.3	54

Source: calculated from 1996 TDHS

It can be observed from Table 69 that women with no education and those who did not complete their seven years of schooling also had lower mean of age at first birth than those who completed their primary or secondary education and above. The mean for those with secondary education and above is 1.1 years above the sample mean. Those without education had 0.4 years below the sample average. On the other hand, completing primary education raises the age at first birth by 0.7 years compared to those

who did not attend any formal education. Attending secondary school or above raises age at first birth by 1.5 years for Tanzanian adolescents. This confirms the hypothesis that the higher the level of education, the higher the age at first birth. Adolescents from rural areas had their first child bearing experience earlier than their counterparts in urban areas, except Dar es Salaam adolescent women. Since modernisation usually starts in urban areas before spreading its influence gradually into the rural areas, in a transitional society such as Tanzania, one would expect the patterns of early child bearing to be more pronounced in rural areas than in Dar es Salaam.

Protestants have higher mean age at first birth than others (Catholics and Moslems), Moslems seem to have the lowest mean age at first birth (16.7 years). The variations may be attributed to the fact that most of the Christians spend longer periods in school than Moslems. This is in line with the findings that most of adolescent respondents (30.8 percent) who did not attend any form of formal education were Moslems.

The analysis of adolescents show that each of the background characteristics including education, age at first intercourse, religion, place of residence, and current age tend to influence adolescent age at first birth. In the following parts, the relationship between a combination of all these variables and age at first birth will be determined in a more complex way. The relationships found earlier between each of the background characteristics and age at first birth may be different when all the variables are combined. Normally, this comes about as a result of the interrelationship between the independent variables. This leads us to supplement bivariate analysis with multivariate analysis.

The background characteristics are the independent variables. The unit of analysis is ever given birth adolescent. For each background characteristic, dummy variables are created with one category being selected as the reference category. As such they are omitted from the equation. This type of regression is the one in which coefficients are compared.

Table 70: Regression results (unstandardised coefficients) of the relationship between adolescent's age at first birth and some selected socio-economic variables

Variable	*Name*	*Dummy*	*Unst. coef.*	*Std. err.*
Current age	Age (continuous)	V012	0.548***	0.066
Education	None	RC		
	Primary incomplete	E2	0.183	0.180
	Completed primary	E3	0.440**	0.151
	Secondary+	E4	0.862*	0.488
Age at first sexual intercourse	At union	I2	0.774***	0.191
	<15	RC		
	15-17	I4	0.550***	0.161
	18-19	I5	1.408***	0.244
Religion	Moslems	R1	-0.097*	0.146
	Catholics	RC		
	Protestants	R3	0.282*	0.155
Place of residence	Urban	U1	-0.082	0.157
	Rural	RC		
Constant			5.985***	1.166

R^2 (adjusted) = 0.361 and Durbin-Watson = 2.143
*** p<.001
** p<.01
p<.05
Source: calculated from 1996 TDHS

The relationship between current age and age at first birth as found earlier on was confirmed in the regression analysis. Current age is found to be positively related to age at child bearing: An increase in two years of age leads to a rise of one year in first birth of an adolescent; the relationship is significant.

The results in Table 70 show that education raises the age at first birth. Adolescent women who completed primary education have a higher age at first birth compared to those with no education; the difference is statistically significant. Secondary education raises adolescents' age at first birth; the difference is statistically significance.

Age at first intercourse is positively related to age at first birth; the relationship is highly significant. A point to note is that women who experience their first sexual intercourse within marriage give birth later than those who experience sexual intercourse outside marriage and before attaining age 15. Late experiences in sexual intercourse explain much the difference in adolescent age at first birth. Education on the other hand plays a significant role.

The results of the regression as shown above support the hypothesis that Christians generally had their first births later than Moslems. A Moslem adolescent tends to have a birth earlier than a Catholic adolescent. Being a Protestant tends to increase the age at first birth compared to Catholic adolescents. The relation is significant. The type of the place of residence is not significantly related to age at first birth for adolescents.

Table 71 confirms the results above. Literate women are 2 times less likely to give birth before age 15 than illiterate adolescents. Protestant adolescents are 2.3 times less likely to give birth before attaining age 15 than Moslems.

Table 71: Logistic regression odds ratio predicting the relative risk that a woman had a live birth before age 15

Variable	*Odds ratio*
Literacy	
Literate	.53*
Semiliterate	1.55
Illiterate	RC
Religion	
Moslem	RC
Catholic	.73
Protestant	.43*
Others	.85
Place of Residence	
Urban	.96
Rural	RC
Age	
15-16	11.06***
17+	RC

*** P< .001
** p< .01
* p< .05
Source: calculated from 1996 TDHS

7.4. Adolescent Premarital Child bearing

The results of Table 72 show that 10.4 percent of all adolescents had premarital[36] births and 1.6 had premarital pregnancies at the time of interview. Therefore, 12 percent of all adolescents had experienced premarital pregnancy in comparison to 15.8 with postmarital pregnancy experience. Of these, 6.3 percent were never married and the rest was married, widowed or divorced but had their first birth before their first marriage. Almost half of the adolescents (46 percent), who had their first pregnancy at the time of the survey, admitted that the pregnancy was unwanted. From these findings, it is evident that the prevalence of premarital births increases with advancing age.

Unmarried adolescents who got pregnant seem to experience sexual intercourse very early as 21 percent of adolescent with history of premarital births had their first sexual experience before the age of 14 and 22 percent between age of 14 to 15. The effect of the level of education on prevalence of premarital births is not clear. However, the prevalence of premarital births seems to be higher for illiterates in comparison to literate. The role of religious denominations on the occurrence of premarital births was investigated. Moslems seem to have a slightly higher proportion of adolescents with a history of premarital births followed by Catholics. Protestants have the least of all (7.4 percent). Place of residence seems to have no effect on premarital births of adolescents in Tanzania.

Table 73 shows the results of the logistic regression model predicting the effect of background variables on the likelihood that an ever-married woman had intercourse before first marriage. Literacy, age, and the age at which a woman marries have the strongest correlates of the likelihood of having had premarital sexual intercourse. Religion has a weak one. Exposure to the risk of premarital sexual intercourse increases with increasing age at which a woman first marries. Women who marry at a later age are significantly more likely to have engaged in premarital sexual relations than women who marry at a younger age. Literate women are 1.5 times more likely to have had premarital sexual intercourse than women who are illiterate: the effect is significant. This may be due the fact that modern education exposes adolescents to different values,

[36] Premarital in this study means out of wedlock. In fact we are not sure if those women who became pregnant before marriage, subsequently marry the same men who were responsible for their pregnancy.

and the school environment enables them to interact more with partners of the opposite sex (Bauni, 1990; Ocholla-Ayayo et al., 1990).

Table 72: Percentage distribution of adolescents by birth status

Characteristics	*Variable*	*Premarital*	*Post-marital*	*No births*	*N*
Current age	15	1.0	-	99.0	289
	16	5.1	3.9	90.9	408
	17	5.0	4.7	90.4	343
	18	16.8	13.1	70.1	358
	19	20.9	33.4	45.7	335
	15-19	10.4	10.5	79.1	1733
Literacy	Literate	9.4	7.9	82.7	1171
	Semiliterate	8.3	11.5	80.3	157
	Illiterate	11.8	19.8	68.4	399
Religion	Moslem	11.6	11.4	77.0	551
	Catholic	10.1	8.7	81.2	552
	Protestant	7.4	12.1	80.5	473
	Others	9.3	14.7	76.0	150
Place of Residence	Urban	9.9	8.9	81.2	415
	Rural	9.9	11.7	78.5	1318
Age at first sexual intercourse	<14	22.1	15.1	62.8	86
	14-15	21.4	18.7	59.9	299
	16-17	22.0	16.6	61.4	259
	18-19	25.4	31.7	42.9	63
	At first union	-	57.6	42.4	125

Source: calculated from 1996 TDHS

Catholics appear to be 1.1 times more likely to have premarital sexual intercourse than Moslems. Protestants are 1.2 times less likely to have premarital sexual intercourse than Moslems. This may be consistent with the strong emphasis on premarital virginity in the Islamic society. Urban residence has a positive effect on premarital sexual intercourse as urban residents are 1.2 times more likely to have had premarital sexual intercourse than their rural sisters; the effect is statistically significant. This finding can be attributed to the modernisation processes in urban areas which tends to disassociate people from traditional social controls. It is believed that the traditional social controls of adolescent sexual behaviour are less effective in urban areas than in rural areas (Adeokun, 1990).

In general, traditions and cultural conventions in Tanzania are weakening. Whereas in the past premarital virginity was an important cultural condition for young women to

become married, this seems to be disappearing. Today, it seems to become important that a woman proves her fecundity prior to establishing a union. More and more men engage into premarital sexual relationships with young women, whom they make believe that they would marry them in the future. Very often, if these women become pregnant, they are left alone and unmarried by their sexual partners, who do not want to take over the responsibility for the pregnant woman. The weakening of cultural conventions results in changes of the behaviour of people, often causing new problems and challenges for a society. Ever since premarital virginity has been losing its importance, the number of women who have to bear their children without getting married to the father increases. On the other hand, pregnancy is increasingly perceived by women as a means to pressure men to marry them.

Table 73: Odds ratio predicting the relative risk that an ever-married woman had premarital sexual intercourse

Variable	*All women*	*Adolescents*
Literacy		
Literate	1.51***	1.37
Semiliterate	1.24*	.81
Illiterate	RC	RC
Religion		
Moslem	RC	RC
Catholic	1.11	.81
Protestant	.86	.63
Others	1.07	.47*
Place of Residence		
Urban	1.23**	1.13
Rural	RC	RC
Age at first Marriage		
<15	.34***	.66
15-17	.43***	.60
18-19	.51***	RC
20-21	.55**	
22-24	.66*	
25+	RC	

*** P< .001
** p< .01
*p< .05
Source: calculated from 1996 TDHS

The effect of background variables on the likelihood that an unmarried adolescent is sexually experienced shows that sexual experience increases with age. Adolescents are six times less likely to be sexually experienced than women older than age 19.

Unmarried Protestant women are less likely to have had sexual experience than Moslems; the effect is statistically significant. Although the effect is not significant, Catholics are less likely to have had sexual experience than Moslems. Therefore unmarried Moslem adolescents are more likely to have sexual experience than others. Unmarried literate adolescents are less likely to experience sexual intercourse than illiterate women. Unmarried urban women are more likely to experience sexual intercourse before marriage than their rural counterparts; the relationship is highly significant. Urban adolescents are 2.2 times more likely to experience sex than unmarried rural resident adolescents.

Table 74: Odds ratio predicting the relative risk that a never married woman is sexually experienced

Variable	
Literacy	
Literate	
Semiliterate	
Illiterate	
Religion	
Moslems	
Catholics	
Protestants	
Others	
Place of Residence	
Urban	
Rural	

*** P< .001
** p< .01
*p< .05
Source: calculated from 1996 TDHS

Table 75 shows the result of a logistics regression model estimating the effect of background variables on the likelihood that a woman has a premarital birth. Due to the fact that the reference is the interval between age at marriage and age at first birth, this model excludes never married women. From the fact that adolescent contraceptive use has remained low in Tanzania (Chapter 6), these differentials in premarital sexual activity are reflected in the level of premarital child bearing. Adolescents are 1.09 times more likely to have had a premarital birth than adults were during their adolescence; the effect is significant.

Age at first marriage is the strongest correlate of premarital child bearing for those who eventually marry. Women who marry late are exposed to the risk of premarital

pregnancy for a longer period of time than women who marry early and they are much more likely to have a child before marriage than women who marry at a younger age. For example, women who marry before attaining 15 years are 17 times less likely to have a first child before first marriage than those who marry at age 25 and more; the effect is highly significant statistically.

Premarital child bearing is more common among literate women than among those who are illiterate. But the effect on the likelihood of having a premarital birth is not significant after controlling for the other variables. This finding does not imply that education per se is the cause of this high level of premarital child bearing but that it is due to the fact that literate women also tend to marry later than illiterate women. Urban residence has a significantly positive effect on premarital child bearing. This finding is consistent with the literature that suggests that premarital child bearing is a modern phenomenon that increases with socio-economic development (Cherlin and Riley, 1986; Kulin, 1988).

Table 75: Odds ratio predicting that a woman had her first child before first marriage

Variable	*All women*	*Adolescents*
Literacy		
Literate	1.01	1.51
Semiliterate	1.18	1.17
Illiterate	RC	RC
Religion		
Moslems	RC	RC
Catholics	1.04	.91
Protestants	.90	.63*
Others	.78*	.73
Place of Residence		
Urban	1.05***	.76
Rural	RC	RC
Current age		
15-19	1.09**	Constant
20+	RC	

Age at first Marriage		
<15	.06***	.10**
15-17	.10***	.57
18-19	.19***	RC
20-21	.26***	
22-24	.43***	
25+	RC	

*** P< .001
** p< .01
*p< .05
Source: calculated from 1996 TDHS

Being Moslem have a positive effect on premarital child bearing compared to other denominations in Tanzania. However, the findings in this chapter seem to suggest that premarital child bearing is a result of degradation of sexual morals as adolescents are now exercising less restrain than was the case in the past, especially educated ones. Meekers (1993) argues that what has changed is not adolescent sexual behaviour and child bearing itself, but rather the social context in which this occurs.

Table 76: Odds ratio predicting that an adolescent did not like the timing of her first pregnancy

Variable	*Odds ratio*
Literacy	
Literate	7.31*
Semiliterate	5.23
Illiterate	RC
Religion	
Moslem	RC
Catholics	.07**
Protestants	.27
Others	.72*
Place of Residence	
Urban	.67***
Rural	RC
Age	
15-17	.69**
18-19	RC
Conception Status	
Premarital	8.48**
Marital	RC

*** P< .001
** p< .01
*p< .05
Source: calculated from 1996 TDHS

On this subject, Cherlin and Riley (1986) raised the question whether adolescent mothers want to give birth. The answer to this question can be reflected in the initial analyses of the DHS data, which suggested that more than 40 percent of adolescent births in Botswana, Ghana, Kenya, Liberia, and Togo were unwanted (Njogu and Martin, 1991). This study found (Chapter 4) that a high proportion of adolescent women in Tanzania had unintended births (27 percent of all births to adolescents), either not wanted at the time the birth occurred or not wanted at all. Therefore some of the adolescents faced with an unplanned pregnancy may turn to illegal abortion. When the abortion is performed by an untrained person, or under unsanitary conditions, the procedure can result in illness, infection, infertility, and even death. Since young women often cannot pay the price of an abortion performed by a medically or paramedical trained person, they risk their lives using fatal methods. Intakes of huge amount of chroloquine tablets were often found to be the cause of death of pregnant adolescent women who wanted to terminate their pregnancies (Justesen, et al., 1992).

Literate adolescents are 7 times more likely to be displeased with their first pregnancies than illiterate adolescents. It is interesting to note that Moslems have a greater likelihood of being displeased with the timing of their first pregnancy while Catholic adolescents are 14 times less likely to be displeased with the first pregnancies than Moslem adolescents; the difference is statistically significant. Although not statistically significant, it seems than Protestant adolescents are 4 times less likely to be unhappy with their first pregnancies than Moslems. On the other hand, those who are neither Christians nor Moslems are 1.4 times less likely to be unhappy with their first pregnancies than Moslem adolescents.

It seems that rural adolescents have a greater likelihood of being displeased with their first pregnancies than their urban counterparts; the relation is statistically significant. Urban adolescent women are 1.5 times less likely to be unhappy with their first pregnancies than rural adolescents. It is not expected that younger adolescents are happier than 18-19 year-old adolescents. However, in this study it was found that adolescent women (15-17 years old) are 1.4 times less likely to be unhappy with their first pregnancies than 18-19 years old adolescent women. This might be from a fact that the older a woman grow the more she sees about the consequences of early pregnancy. Adolescent women who conceive their first pregnancy before their first marriage are

most likely to be displeased with the timing of the first birth. Moreover, they are 8 times more likely to be unhappy with their first pregnancies than married ones. This fact conflicts with men's expectation that women are to prove their fertility before marriage (Dynowski-Smith, 1989; Ocholla-Ayayo et al., 1990). From this finding, it is evident that women do not share this sentiment. Furthermore, these women are expected by their parents and others not to have sex before marriage.

Table 77: Percentage of adolescents in sub-Saharan Africa and selected developing countries by marital status at the birth of the first child

Country	*Year*	*No births*	*Never married*	*X*	*Y*	*Z*	*Premarital Conception*	*Premarital Births*	*Marital births*	*N*
Benin	1996	80.6	1.4	0.5	3.9	13.7	5.8	1.9	17.6	1,075
CAR	1994	71.6	6.2	0.4	3.0	18.7	9.6	6.6	21.7	1,288
Comores	1996	92.7	0.1	0.2	2.4	4.6	2.7	0.4	7.0	844
Côte d'Ivoire	1994	71.5	12.0	2.9	2.5	11.1	17.4	14.9	13.6	1,961
Ghana	1993	81.4	3.6	0.5	5.1	9.3	9.2	4.1	14.4	803
Kenya	1993	83.2	7.4	2.0	2.6	4.7	12.0	9.4	7.4	1,754
Mali	1995	66.4	4.4	0.8	6.1	22.4	11.3	5.2	28.5	1,883
Tanzania	**1996**	**79.2**	**5.9**	**1.4**	**2.5**	**11.1**	**9.8**	**7.3**	**13.6**	**1,732**
Uganda	1995	65.9	3.3	3.0	4.5	23.3	10.8	6.3	27.9	1,606
Zambia	1996	76.2	5.8	2.2	4.6	11.2	12.7	8.1	15.8	2,003
Zimbabwe	1994	85.3	2.9	1.0	3.6	7.3	7.4	3.8	10.9	1,472
Egypt*	1995	48.9	-	-	1.5	49.8	1.5	-	51.3	673
Bangladesh*	1996	49.6	-	-	0.5	49.8	0.5	-	50.3	1,416
Brazil	1996	85.7	2.7	1.3	3.7	6.7	7.6	3.9	10.4	2,464
Dominican Republic	1996	81.7	0.9	0.4	2.3	14.8	3.6	1.3	17.1	1,801

* ever married women only

X = first births occurred before first marriage for ever married women; Y = first births within marriage but less than 9 months after first marriage; Z = first birth of 9 months or more after the first marriage;
Premarital first conception = Never married +X + Y;
Premarital first birth = Never married + X;
Legitimate first conception = Z

Source: calculated from DHS III

On the other hand, scholars suggest that women who become pregnant before marriage might use pregnancy to urge the father to marry her before the birth of the child (Karanja, 1987; Obbo, 1987). A comparison between the Tanzanian situation and other countries in sub-Saharan Africa that conducted DHS III could be useful in clarifying this matter.

The percentage of sub-Sahara African adolescents who have not yet experienced a live birth varies between countries. It ranges from 65.9 percent in Uganda to 92.7 85.3 percent in Comores. These figures mean that in sub-Saharan Africa countries at the time

of survey more than one in five female adolescents were already mothers. The percentage of unmarried adolescents in sub-Saharan Africa with at least one live birth ranges from 0.1 percent in Comores to 12.0 percent for all adolescents in Côte d'Ivoire. Other countries with more than 5 percent of never married adolescents with experience of a live birth include Kenya (7.4 percent), the Central African Republic (6.2 percent), Tanzania (5.9 percent), and Zambia (5.8 percent). It is interesting to note that while Uganda has a low percentage of adolescents without any birth, most of adolescents eventually got married. Only 3.3 percent adolescents experienced births and were still not married at the time of the survey.

Women, who had their first birth out of wedlock but eventually got married later, range from 0.2 percent in Comores to 3 percent in Uganda. This means that in most sub-Saharan Africa countries premarital virginity is no longer a strong precondition for a first marriage as a woman would be able to get married even with a child especially in countries like Uganda. However, the share of women in sub-Saharan Africa who conceive outside marriage ranges between 2.7 percent in Comores to 17.4 percent in Côte d'Ivoire. Adolescent premarital births in sub-Saharan Africa ranges between 3.8 percent of all adolescents in Zimbabwe to 14.9 in Côte d'Ivoire. Comores and Benin have the lowest percentages (0.4 and 1.4 percent respectively).

If we concentrate on adolescents who gave birth only, premarital pregnancies seem to be a major problem in sub-Saharan Africa countries. Almost more than half of all adolescents' first pregnancies occurring in sub-Saharan Africa countries are among unmarried adolescents. For example 72 percent of all first adolescent pregnancies in Kenya were conceived outside marriage and premarital birth amounts to 56 percent of all adolescent births. However, most of these premarital births (44 percent) among adolescents who were still single at the time of the survey.

Table 78: Percentage distribution of first births by adolescent marital status at the time of the birth in sub-Saharan Africa and selected developing countries

Country	*Year*	*Never married*	*X*	*Y*	*Z*	*Premarital conceptions*	*Premarital births*	*N*
Benin	1996	7.2	2.4	20.1	70.3	29.7	9.6	209
CAR	1994	21.9	1.4	10.7	65.8	33.9	23.2	366
Comores	1996	1.6	3.2	32.3	62.9	37.1	4.8	62
Côte d'Ivoire	1994	42.0	10.2	8.8	39.0	61.0	52.2	559
Ghana	1993	19.5	2.7	27.5	50.3	49.7	22.1	149
Kenya	1993	44.1	11.9	15.6	28.1	71.5	55.9	295
Mali	1995	13.1	2.4	18.2	66.5	33.6	15.5	633
Tanzania	**1996**	**28.3**	**6.6**	**12.2**	**53.2**	**47.1**	**34.9**	**361**
Uganda	1995	9.7	8.8	13.3	68.4	31.8	18.4	548
Zambia	1996	24.5	9.4	19.3	47.0	53.2	34.0	477
Zimbabwe	1994	19.4	6.5	24.4	49.3	50.2	25.8	217
Egypt *	1995	-	-	2.9	97.4	2.9	-	344
Bangladesh*	1996	-	-	1.0	98.9	1.0	-	713
Brazil	1996	18.7	8.8	25.8	46.7	53.3	27.5	353
DR	1996	4.8	2.1	12.7	80.6	19.7	7.0	330

* ever married women only

X = first births occurred before first marriage for ever married women; Y = first births within marriage but less than 9 months after first marriage; Z = first birth of 9 months or more after the first marriage;
Premarital first conception = Never married +X + Y;
Premarital first birth = Never married + X;
Legitimate first conception = Z

Source: calculated from DHS III

Countries with severe problems of adolescent premarital first births (more than 25 percent) in sub-Saharan Africa include Kenya (56 percent), Côte d'Ivoire (52 percent), Tanzania (35 percent), Zambia (34 percent), and Zimbabwe (26 percent). This means that more than one in four adolescent mothers is single. Comores have the lowest percentage of adolescent premarital first births, 5 percent, and Benin, 10 percent. From the data we might conclude that among every four first born children of adolescents in sub-Sahara African, one will have unmarried mother.

However it is interesting to note that in sub-Saharan Africa for those adolescents who conceive out of wedlock more than half give birth before their first marriage (Côte d'Ivoire, Kenya, Tanzania etc). However, in a few countries like Comores, Benin, Ghana, and Mali more than half of those who conceive before marriege, eventually marry before the first birth.

7.5. Awareness and use of contraceptives

Concerns about the adverse consequences of early child bearing, particularly for unmarried women, and the risks of contracting sexually transmitted diseases have led to renewed interest in the contraceptive[37] and sexual behaviour of adolescents. The fact that adolescents have an enormous impact on future population growth make an understanding of the extent to which young women are aware of and use contraceptives a significant policy issue. This section will shed light on contraceptive use among adolescents especially unmarried ones. Little however is known on the subject in sub-Saharan Africa (McDevitt, 1996).

Until recently, contraceptive information and services in Tanzania were only available to married women while single women and adolescents did not have access to these services. However, the family planning policy has now been changed such that some of these services are now available to all sexually active persons regardless of their age and marital status. Despite this positive change in policy, there is a paucity of information on the availability of these services to the adolescents mainly because they are still being provided through the MCH/FP program. As the program is adult oriented, young women tend to perceive it as being meant for adults and hence not accessible to them.

In this section therefore, the unit of analysis are all adolescent women who are sexually experienced. This is due to the fact that potential or actual contraceptive users are those who are at the risk of becoming pregnant. An adolescent who has never experienced sexual intercourse yet is not in need to use contraceptives. In the TDHS the question used was 'which ways or methods of family planning have you heard about'. In fact, it means awareness than rather knowledge as knowledge encompasses awareness and how to use the method. For the use of contraceptives our denominator will be further refined by excluding those who were pregnant at the time of the survey.

Awareness of family planning methods among adolescents in Tanzania was 81 percent but very few of them use contraceptives. Only 6.4 percent of adolescents, who are aware of any contraceptive method, do contracept. Results have shown (Table 79) that the awareness as well as the use of contraceptives tends to increase with increasing age

[37] The term contraception here will mean modern methods of contraceptives.

of the adolescent. It was found that adolescents who use contraceptives use mainly the pill (40 percent), condoms (33 percent), and injections (18.2 percent). Awareness of contraceptives tends to vary with the level of education, The higher the level of education the higher is the awareness of adolescents on contraceptive methods. The same applies for the use. Only 1 percent of those who have never attended school use contraceptives compared to 26.3 percent of those who has secondary or higher education.

Awareness of contraceptives varies with adolescents' place of residence. Adolescents residing in urban centres had higher awareness of contraceptive than those residing in the rural areas. Likewise 15.5 percent of urban adolescents use contraceptives while only 3 percent of rural adolescents contracept. When we separated Dar es Salaam from the other urban areas, we find that 15.6 percent of Dar es Salaam residents are using contraceptives, mainly pill, 12.5 percent of other urban residents use contraceptives, mainly pill and injections, while only 4.5 percent rural residents use contraceptives. Religious affiliation was also found to be associated with awareness and usage of contraceptives. Female Moslem adolescents have a high level of contraceptive awareness and use compared to those of other denominations. It is interesting to note that 8.7 percent of Catholic adolescents use contraceptive. While only 0.9 percent of Protestant adolescents contracept, Protestants are more aware than Catholics. This result was not expected especially for use of contraceptives. We expected Catholics to have the lowest level of all due to the Vatican's refusal to accept contraceptive use (Chapter 6). Perhaps new generations are against religious directives on modern contraceptive use. However, Catholics use mainly condoms. Protestants use mainly condoms, while Moslems use mainly the pill.

It seems that there is a positive relationship between age at first intercourse, marriage, and birth with the awareness of contraceptives. Contraceptive use has no clear pattern. It is very interesting to note that divorced adolescents use even more contraceptives than currently married ones. It seems that divorced adolescents had sexual partners besides their official husbands and use contraceptives not for spacing or limiting but to prevent out-of-wedlock pregnancies (refer the definition of divorced in Chapter 6). Widowed women seem not to use contraceptives as they are not accountable for anybody after the death of their spouse. Married adolescents in polygamous unions use less contraceptives

than those in monogamous unions. This situation can be attributed to the compensation effects or the catch-up hypothesises (Chapter 5). Most adolescents in polygamous union are the second or more in rank to the husband; 93 percent, while first wives adolescents account for 7 percent of all adolescents in polygamous union. All of them use mainly the pill.

Table 79: Percentage distribution of adolescents' contraceptive awareness and use

Characteristic	*Awareness*	*Use*	*Method Specific use*						
			Pill	IUD	Injec	D/F/	Con	Steri	N
Age									
15	72.5	2.0					100		1
16	63.8	3.3			40.0		60.0		5
17	78.5	5.9	50.0	12.5			37.5		8
18	82.1	7.7	57.1		7.1		28.6		14
19	91.3	11.3	37.0	7.4	25.9		29.6		27
15-19	81.0	7.4	40.0	5.5	18.2		34.5		55
Education									
None	58.1	1.2	100						2
Primary incomplete	77.5	5.4	40.0	10.0	10.0		40.0		10
Primary complete	91.0	9.1	40.6	3.1	28.1	3.1	25.0		32
Sec +	97.4	29.4	30.0	10.0			60.0		10
Literacy									
Illiterate	80.8	1.4	100						3
Semiliterate	83.1	4.5	33.3		66.7				3
Literate	90.0	11.0	37.5	6.3	16.7	2.1	37.5		48
Current school attendance									
Out of school	88.0	13.5	41.3	6.5	19.6	2.2	30.5		46
In school	77.3	16.9	37.5		12.5		50.0		8
Place of Residence									
Urban	94.2	17.1	41.7	8.3	19.4	2.8	27.8		36
Rural	75.9	3.5	42.1		15.8		42.1		19
Specific Place of residence									
Dar es Salaam	93.8	16.7	54.5	18.2	9.1	9.1	9.1		11
Other Urban	96.2	14.3	46.2		30.8				13
Rural	77.4	5.4	33.3	3.3	16.7		3.3		30
Religion									
Moslem	87.9	11.7	45.2	6.5	22.6	3.2	19.4		31
Catholic	83.5	10.2		5.0	15.0		50.0		20
Protestant	84.3	1.1					33.3		3
None/others	43.0	0							
Age at first intercourse									
<12	51.0	.1							
12-13	76.7	6.7	75.0		25.0				4
14-15	79.7	6.0	44.4		16.7		38.9		18
16-17	88.0	8.5	34.8	8.7	17.4	4.3	34.8		23
18-19	88.9	6.3	50.0				50.0		4
At union	72.8	4.0	16.7	16.7	33.3		33.3		6

Characteristic	*Awareness*	*Use*	*Method Specific use*						
			Pill	IUD	Injec	D/F/	Con	Steri	N
Age at first marriage									
<12	25.0	0							
12-13	72.2	5.6			100				1
14-15	71.9	6.3	25.0	25.0	25.0	25.0			8
16-17	84.1	5.8	76.9		7.7	7.7	7.7		13
18-19	89.0	2.4	50.0		50.0				2
Age at first birth									
<12	-	-							
12-13	60.0	0							
14-15	88.2	7.8	50.0	25.0	25.0				4
16-17	83.7	11.0	45.0	5.0	30.0	15.0	5.0		20
18-19	89.8	3.9	60.0	20.0	20.0				5
Marital status									
Never married	81.0	8.2	32.3	3.2	16.1	3.2	45.2		31
Married	80.0	5.8	50.0	11.1	16.7		22.2		18
Widowed	33.3	0							
Divorced	85.7	20.0	75.0		25.0				4
Not living together	100	15.4	50.0		50.0				2
Polygyny									
Monogamous	81.5	6.1	46.7	13.3	20.0		20.0		15
Polygamous	73.5	4.8	50.0		25.0		25.0		4

Key: Injec = Injections
D/F/ = Diaphragm, foam and jelly
Con = Condom
Steri = Sterilisation
Source: calculated from 1996 TDHS

Contraceptive use among adolescents in sub-Saharan Africa is still low. It is clear from Table 80 that contraceptive use among adolescents in sub-Saharan Africa ranges from 2 percent in Comores and Central African Republic to 8 percent in Zimbabwe. However, our interest is to investigate the modern contraceptive use to delay the first birth. In this sense, we have to refine the denominator. Adolescents who are sexually experienced, not pregnant and have never given birth are the ones who are at the risk of first pregnancy hence can use contraceptives to delay the first birth. It was found that between 2.4 percent in Kenya to 23.1 percent in Comoroes adolescents use contraception to delay the first birth. But if we refine our denominator further to include only adolescents who are at risk of premarital birth by eliminating those who are or

have been married, we find that more adolescents use contraception to avoid premarital births. It ranges from 3 percent in Kenya to 27 percent in Comores.

Table 80: Adolescent modern contraceptive use in sub-Saharan Africa countries and selected developing countries

Country	*Year*	*Use (General)*	*Use to delay first birth*	
			All	Not currently married
Benin	1996	2.1	5.1	5.8
Central African Republic	1994	2.0	4.0	5.1
Comores	1996	2.0	23.1	26.5
Côte d'Ivoire	1994	5.2	10.7	12.5
Ghana	1993	5.0	9.0	9.5
Kenya	1993	2.4	2.4	2.9
Mali	1995	3.2	7.1	12.4
Tanzania	**1996**	**3.1**	**6.6**	**8.9**
Uganda	1995	3.4	9.2	16.9
Zambia	1996	4.7	7.3	8.1
Zimbabwe	1994	7.5	10.4	12.6
Egypt	1995	15.6	0.0	0.0[38]
Bangladesh	1996	18.0	12.1	0.0[39]
Brazil	1996	13.2	45.8	44.0
Dominican Republic	1996	8.2	27.5	21.3

Source: calculated from 1996 TDHS

With the exception of Côte d'Ivoire, many sub-Saharan Africa countries have a high percentage of premarital births and a low contraceptive prevalence rate reducing the number of young women who are able to delay their first birth. It seems that there is a relationship between contraceptive use and premarital births. The other finding from Table 80 is that in sub-Saharan Africa's married adolescents usually do not delay their first births. In contrast even married youngsters from Bangladesh, Brazil and the Dominican Republic use modern contraceptives to delay their first births. This is due to the fact that after removing from the sample currently married adolescents, the percent of contraceptive users drops from its original figure. While in the case of sub-Saharan Africa, the percentage increases after removing currently married women. This is another proof that married women in sub-Saharan Africa do not delay their first births and the meaning of marriage is to have at least one child, but usually a larger number than just one.

[38] All sampled adolescent respondents were married and are not contracepting to delay the first birth.

[39] All sampled adolescents were ever married, 1 was divorced, 27 widowed and the rest were married. Those who are using contraceptive were 66 which meant there were married adolescent women who are contracepting.

7.6. Unmet Need and Demand for Family Planning among Adolescents

It has been shown in section 7.1 that premarital child bearing is increasing and expected to increase further. In Table 79 we found that adolescent contraceptive use is still very low. Low contraceptive prevalence might arise due to the fact that the there is a proportion of adolescent women who are exposed to the risk of pregnancy but are not using contraception despite the fact that they want to limit or space their births. The proportion of adolescent women with unmet need along with the proportion of women currently using contraception provide family planning programme managers with information on the magnitude of the potential demand for contraceptives and services.

As we have already seen in Chapter 6, women with unmet need are classified into two groups: those with unmet need for spacing births, and those with unmet need for limiting births. However, the crude measure that currently married women represent the sexually active women among adolescents can give a biased information as this group represents only 23 percent of adolescents (Table 7).

Many scholars have tried to estimate unmet need in different ways. Westoff and Pebley (1981) used WFS data for 18 countries to estimate the unmet need for contraception using twelve different combinations based on exposure and attitudinal criteria. The first measure of unmet need includes currently married women of reproductive age who are exposed to the risk of pregnancy but do not want any more children and are not using an effective method. The second measure is similar to the first except that woman using any form of contraception are classified as having met their need. In each of the ten other measures the definition of unmet need is made more stringent by adding exposure or attitudinal criteria. Measure three includes women, who stated that their desired number of children is less or equal to their actual number; and measure four includes only fecund and non-pregnant women.

The major limitation for Westoff and Pebley's procedure, however, is that the unmet need group includes only women who wanted no more children, that is, unmet need for limiting births. It implies that women with unmet need for spacing births are not included (assumed not to have unmet need for family planning). This can seriously

under-estimate the magnitude of unmet need particularly where contraceptive use for spacing purposes is widespread. Westoff and Pebley (1981) acknowledge this problem. Regardless of the shortcomings, their method has been applied elsewhere (see for example Boulier, 1984; Mturi, 1996; Shah and Ahmed, 1982).

Nortman (1982) has developed a model that incorporates both "limiters" and "spacers". Nortman defined birth spacers as women who want to postpone their next pregnancy for a period of one year or more from the time of the interview. The approach measured unmet need for contraception over a one-year period in which fractions of exposure were calculated. The estimates obtained, using data from six developing countries; Bangladesh, Colombia, Costa Rica, Korea, Mexico, and Thailand which participated in the Contraceptive Prevalence Surveys (CPS), suggest that the percentage of fecund and currently married women of reproductive age with unmet need for contraception ranges from 22 percent to 67 percent. The key feature of this method is that it incorporates time as a factor, which allows pregnant or amenorrheic women to rejoin the group of exposed women and require contraceptive protection for at least part of the time span under review (Nortman, 1982). The application of Nortman's method has been very limited because the method produces estimates which are very close to the current-status measures described below despite of its complexity of calculation and description (Westoff, 1988).

The method for estimating unmet need for contraception most commonly used is the one given by Westoff (1988) and latter refined by Westoff and his colleagues (Westoff and Ochoa, 1991; Westoff and Moreno, 1992). This method uses current-status information given by currently married women to estimate the potential demand for contraception for spacing and for limiting births. Pregnant or amenorrheic women, whose pregnancy was unintentional (mistimed or unwanted), are included in the group with unmet need in the recent past. This method has been widely used as a standard procedure for estimating unmet need for contraception using DHS data.

However, Dixon-Mueller and Germain (1992) have argued that the method over-estimates the level of unmet need as (in some cases) a considerable part of women included in the unmet need group are currently not exposed to the risk of pregnancy. For instance, Dixon-Mueller and Germain were suspicious of the findings of Goldman

et al. (1989) who estimated a total unmet need for Peru in 1986 to be 29.4 percent while only 7.6 percent of these women were assumed to be currently exposed to the risk of pregnancy, i.e. currently sexually active.

The argument that Westoff's approach over-estimates the level of unmet need for contraception is supported by Bongaarts (1991). Bongaarts suggests a method which adjusts Westoff's procedure downwards (based on two arguments) to give upper and lower boundaries for the actual unmet need. He illustrates the method using 15 DHS surveys. The method assumes that fulfilling the unmet need for spacing reduces the unmet need for limiting by an equivalent amount among women who will have a need for limiting births. It is therefore necessary to have an adjustment factor which is subtracted from Westoff's estimates to show the reduction in the need for limiting births resulting from satisfying spacing demands. This gives the maximum estimate. The minimum estimate is obtained by making a downward adjustment to correct the over-estimation of spacing needs. The point estimate is obtained by taking the mean of the maximum and minimum values which shows that, on the average, 17 percent of currently married women in the 15 countries studied have unmet need for contraception. Westoff's approach gave a comparable figure of 21 percent.

Bongaarts' approach has been criticised that it deals with what will be realised in the future given a steady state rather than giving an estimate of current need which programme managers require (Westoff, 1992). However, Bongaarts argued that his approach '...can be interpreted either as the *current* unrealised contraceptive use that has resulted from unmet demand in the past, or as the future rise in prevalence that could be achieved given present preferences for the timing and quantity of child bearing' (Bongaarts, 1991:127).

In other words, Bongaarts defines unmet need as the additional contraceptive use that would be required to achieve fertility levels consistent with women's stated reproductive intentions and to eliminate all mistimed and unwanted pregnancies. In this chapter we will adopt and try to modify Westoff's (1988) methodology because the major interest of this analysis is to examine the current situation using most preferably current-status information. Furthermore, the simplicity of the method and the fact that it has been

applied in many DHSs makes it possible to compare the estimates. Our main task will be to identify current sexually active women.

The shortcoming of Westoff's approach is that it distinguishes women who are currently in a union from those who are not. In doing so the approach excludes currently not married (never and formerly married) women from the calculation of unmet need. His argument that married women are more exposed to the risk of conception than are unmarried women might have been true regarding all women, but can lead to false estimate when dealing with a specific group like adolescents, since premarital sexual activities cannot be ignored. It was found in Table 78 that 47 percent of all births to adolescents were results of premarital conception.

In order to capture all sexually active adolescents, we categorised sexually experienced adolescents into two categories: the first category being those adolescents who are currently married or living with partners therefore considered sexually active. We assume that any adolescent who declares to have a sexual partner is sexually active. The second category consists of never married, widowed, and divorced adolescents. The major task is to distinguish sexually active from sexually inactive (whether still attending school or not).

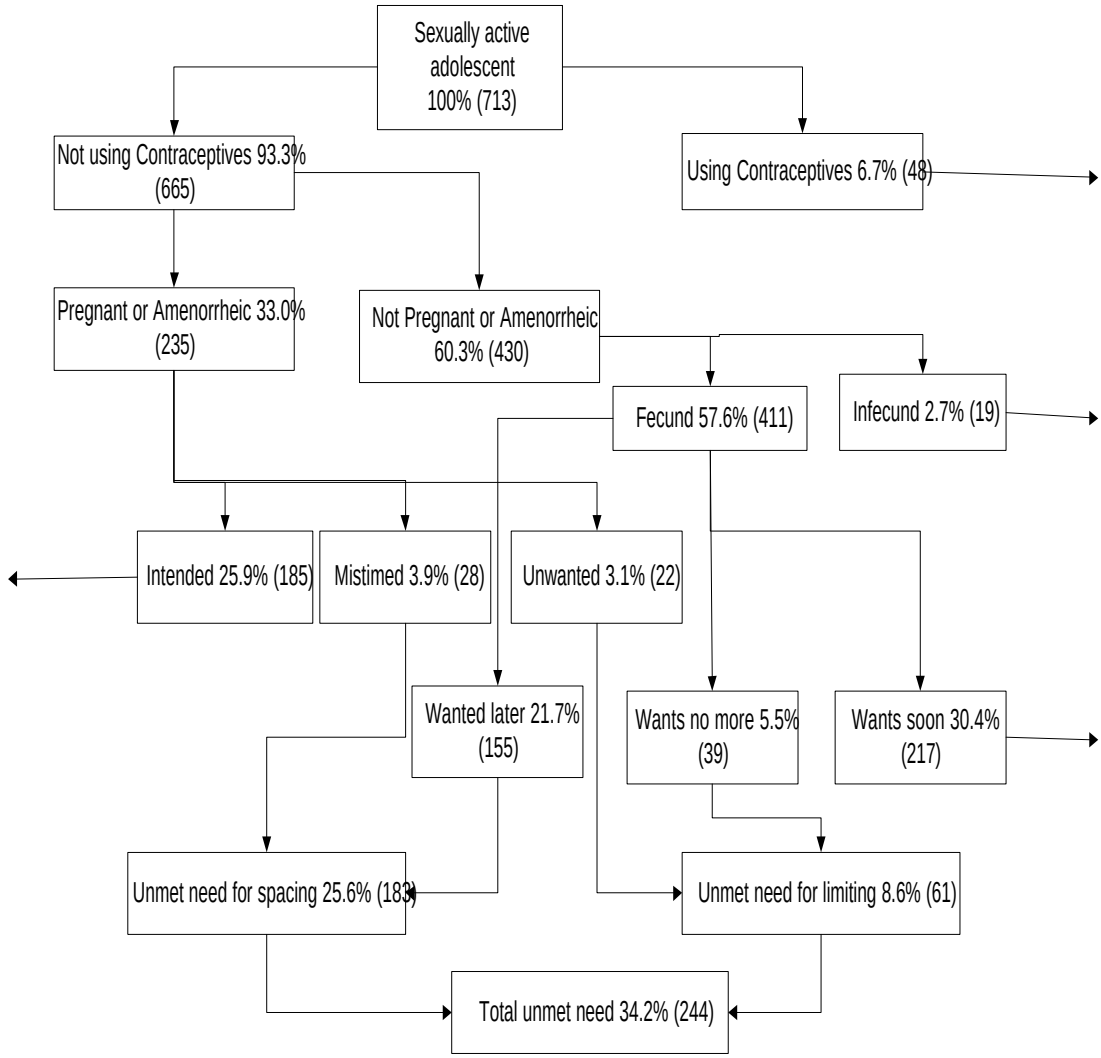
In the 1996 TDHS, there were two questions used to identify those who were sexually active. Those who were not married or living with a man were asked if they had a regular sex partner. From the answers to this question, adolescents whose stated they had a regular sexual partner were categorised as sexually active. The second question that helped to identify sexually active adolescents currently not in union was the date of last sexual intercourse in the 12 months prior to the survey. Those who acknowledged to have had sexual intercourse within one month prior to the interview are assumed to be sexually active. Our assumption here is that the experience prior to an interview reflects the respondent's lifetime experience. Combining this group of women who are currently not married and not living with partner but have some sexual contacts with those adolescents, who are assumed to be sexually active due to the fact that they are either currently married or living with a man, forms a group of sexually active adolescents who are at risk of becoming pregnant.

By definition, adolescent women have an unmet need for contraception if they are not using a contraceptive method but are capable of conceiving, are exposed to the risk of pregnancy, and wish to avoid or to postpone pregnancy. Therefore adolescent women currently using some form of contraception or being sterilised are assumed to have their need met. More explanations can be obtained from Chapter 6.

Figure 25 shows the distribution of sexually active adolescent women according to the components of unmet need for family planning. The figure shows that 65.7 percent of sexually active adolescent women were considered not to be in need of contraception due to the following reasons:

(i) 6.7 percent of sexually active adolescents currently use contraceptives,
(ii) 2.7 percent of sexually active adolescents seem to be infecund,
(iii) 25.9 percent of sexually active adolescents intended to become pregnant,
(iv) 30.4 percent of sexually active adolescents want a child soon.

Figure 25: Estimates of Unmet Need for family planning



The total unmet need for family planning among sexually active adolescent women in Tanzania is 34.2 percent; 25.6 percent have unmet need for spacing births and 8.6 percent want to limit births. In Chapter 6 it was found that the unmet need for all women in Tanzania was 27.5 percent, unmet need for spacing being dominant (15.7 percent). This finding shows that in Tanzania there is a higher prevalence of unmet need for family planning among adolescents than older women of more than 20 years.

The total demand for family planning is obtained by adding the unmet need to the current use of contraception. The estimated total demand is therefore 40.9 percent (34.2 percent unmet need and 6.7 percent current contraceptive users). This implies that if every sexually active adolescent woman in Tanzania in need of family planning uses a method, the contraceptive prevalence rate would raise from the current figure of 6.7 percent to 40.9 percent.

7.7. Concluding remark

We have observed that adolescents in Tanzania engage in sexual activities at early ages. In the average, adolescent experience first sexual intercourse when there are 15 years. Data from DHS III also showed that mean age at first sexual intercourse ranges from 14.2 years to 16.2 years in sub-Saharan Africa countries. Mean age at first marriage ranges from 14.9 years to 16.4 years. Mean age at first birth in Tanzania was found to be 2 years more than age at first sexual intercourse. In other sub-Saharan Africa countries, the difference was found to be between 0.6 years to 1.6 years. In Brazil it is 4.2 years after first sexual intercourse.

We have observed a high rate of premarital adolescent pregnancies, 47 percent of all adolescent women in Tanzania. Some 12.2 percent of adolescents who became pregnant out of wedlock got married before the birth of their first child. 6.6 percent got married after the birth of their first child and the remaining 28.3 were still not married at the time of the survey. In Kenya 72 percent of all adolescent births were conceived as premarital pregnancies although 15.6 percent got married before the birth. This study found premarital births to be a serious problem among unmarried adolescent in sub-Saharan Africa. In all adolescent births in Kenya, 44 percent of all young mothers (15-19) were singles at the time of the survey, 42 percent in Côte d'Ivoire, 28 percent in Tanzania, and 25 percent in Zambia. Children born out-of-wedlock to adolescent mothers generally are severely disadvantaged because their mothers tend to be illiterate, poor, and in poor health condition (Gyepi-Garbrah, 1985a).

In this study we found that literate women had a higher likelihood of having a premarital sexual intercourse than illiterates. This is due to the fact that marriage is delayed for literate women, so they have a long time before being married. However a single literate woman is less likely to experience sexual intercourse than an illiterate single woman. Literacy raises age at first birth for adolescents. Literate adolescents on the other hand are more likely to be displeased with the timing of their first birth than illiterate adolescent women. The more years an adolescent attends school, the higher the age at first birth.

An urban woman had a higher likelihood of experiencing premarital intercourse than a rural woman. Altogether single urban women are more likely to experience sexual

intercourse than their rural counterparts. However, urban adolescents are less likely to be displeased with the timing of the first birth.

Protestant single women are less likely to experience sexual intercourse compared to Moslems. Moslem adolescents are more likely to experience premarital birth than Christians. Moslem adolescents are more likely to be displeased with the timing of the first child than Christians, because Moslems adolescents have the first birth earlier than Christians.

The analysis has shown that the majority of adolescents are aware of modern contraceptives (65.3 percent). However, very few use them (6.4 percent). The awareness of modern contraceptives increases with age: 85 percent of older adolescents (19 years) are aware of at least one method of modern contraceptives in comparison with 46 percent at age 15. 7.8 percent of 19-year-old women in Tanzania use modern contraceptives. The percentage of adolescents who use contraceptives decreases with lower age to 0.3 percent of adolescents at age 15. The fact that awareness of family planing among adolescents is high yet contraceptive use remains as low as 3.1 percent is a dilemma. This shows that awareness alone cannot make sure that adolescents use contraceptives. Further studies need to be carried out to determine factors which might be in play for adolescents not to be using contraceptives although they are aware of contraceptive methods.

Adolescents residing in urban areas were more aware, and use contraceptives to a higher degree than those in rural areas. This might be due to the fact that health facilities are more concentrated in urban areas than in rural areas. Several kinds of mass media too are concentrated in urban areas.
Moslem adolescents are aware and use contraceptives more than other religious affiliates. However, although Protestants are more aware of modern contraception methods than Catholics, it is Catholics who use contraceptives more than Protestant adolescent women in Tanzania. This finding was not expected, as it is known that the Catholic Church is generally opposed to modern contraception.

Adolescent awareness and use of contraceptives did not show any relationship with age at first sexual intercourse, marriage, and birth. Adolescents, who were formerly married,

had a higher awareness and use than those who had never been married. This might be due to the fact that those who were formerly married are probably more careful and cautious in preventing pregnancies, as they are not currently married.

High levels of education and literacy were related to contraceptive usage. The explanation for this finding is that it is adolescents attending schools who are more exposed to the adverse effects of unwanted pregnancies. However, adolescents who were not in school anymore are more aware of contraceptives than those who are still in schools. Those who are still in school use contraceptives more than those who do not attend school anymore. The explanation could be that those who are still attending school are afraid of being expelled from school if they become pregnant. Those out of school probably include those who had a premarital pregnancy and were expelled from school and therefore had nothing to lose. Most of those in schools use condoms, the pill and injections. In this study it was found that each country studied, unmarried adolescents use more contraceptives to delay first birth than married adolescents.

The total unmet need for family planning among adolescent women in Tanzania was found to be 34.2 percent. Unmet need for spacing being dominant 25.6 percent. The total adolescent demand for family planning amounts to 37.3 percent of all adolescents.

In general it was found in this study that a gap between first intercourse and first marriage among adolescent women has increased across age cohorts. This increase is predominantly a result of age at first sexual intercourse and rising of age at first marriage. The consequence of this larger gap, in combination with the overall growth in the number of adolescents, is the increasing number of adolescent women who are exposed to the risk of premarital pregnancy. This will be associated with negative outcomes such as school dropping or unsafe abortions.

8. Summary and Conclusions

The analyses of fertility based on DHS data show that although fertility levels in Africa are still the highest in the world, in several African countries a declining trend can be observed. Tanzania is among them. The fertility level has played a significant role in causing a high population growth rate, estimated to be around 3 percent per year. As a consequence, the government established a Tanzanian National Population Policy (TNPP), which, among other things, encourages a reduction in fertility.

It was essential therefore to undertake a study on the prevailing situation of fertility so as to be able to assess the TNPP in the future.[40] The 1991/92 and 1996 Tanzania Demographic and Health Surveys (TDHSs) provide the sets of data suitable for a detailed study of fertility and the use of family planning methods at the national level. In the TDHSs, two national representative samples of 9,238 (1991/92) and 8,120 women age 15 to 49 were interviewed. The responses given by these women have been used to examine the reproductive behaviour of Tanzanian women and to suggest potential measures that can be taken in order to reduce fertility. In addition to the TDHSs, data from the 1967, 1978 and 1988 censuses have been used to study fertility trends in Tanzania. Other issues discussed in detail in this study include age at first birth and its proximate determinants, contraceptive practices and unmet need for family planning, and premarital first births among adolescents. Besides Africa, DHSs were conducted in the Middle East, Asia, Central America/Caribbean, and South America. Efforts were made to compare our findings with other sub-Saharan Africa countries that conducted the DHS III between 1993 and 1996. In addition, we selected Brazil to represent South America, Bangladesh to represent South Asia, the Dominican Republic to represent Central America/Caribbean, and Egypt to represent North Africa and the Middle East. The choice of these countries was to some extent due to the fact that these countries conducted DHS III so far but also made the data available for scholarly analysis.

[40] The Population Planning Unit of the Planning Commission intends to review the TNPP in the future.

8.1. Summary of Findings

In order to provide insights into the mechanisms underlying fertility change, the components of fertility needed to be examined. Age at first intercourse, marriage, and birth were studied for this purpose. According to 1996 TDHS, mean[41] age at first sexual intercourse was found to be 16 years, age at first marriage was found to be 17.4 years while mean age at first birth was estimated to be 18.4 years. On average, Tanzanian woman marries one year after her first sexual experience and gets her first child after one year of marriage, i.e. two years after her first sexual intercourse. It was further found that 10 percent of the women had their first sexual intercourse below age 13.2, were married below age 13.7 and had their first child below age 15. Seventy five percent of the women had their first sexual intercourse below age 17.7, married below age 19.6 and became mothers for the first time below age 20. This indicates that 3 out of 4 mothers in Tanzania start child bearing during their adolescence. Only 25 percent of all mothers got their first child after adolescence.

The trend shows that age at first sexual intercourse has remained on the same level across the cohorts. However, there is a slight increase in the recent years as mean age at first intercourse, for women aged 40-44 is 15.9 years while for women aged 20-24, who represent recent periods, it is 16.4 years. This trend can be associated with the increasing number of girls attending school in conjunction with strict rules that do not permit visibly pregnant girls and young mothers to attend school. On the other hand, women are now getting married later than the generations of women in the past. This situation has made premarital births to be on the increase. This statement is confirmed by the finding that adolescents are more likely to have a premarital birth than women above age 20.

This study found that, in general early entrance into sexual relations means early entrance into child bearing and consequently high fertility in sub-Saharan Africa countries. On average women in sub-Saharan Africa experience sexual intercourse early, between age 15.0 in Côte d'Ivoire and 17.2 years in Zimbabwe. On average, women in sub-Saharan Africa marry early. Mean age at first marriage ranges between 15.6 in Uganda and 18.1 in Zimbabwe and Ghana. The mean age at first birth in sub-Saharan Africa ranges from 17.7 years in Uganda to 19.2 in the Comores. Egypt, Brazil, and the

[41] Trimean as defined in chapter 3.

Dominican Republic have a higher age at first birth, 20.0, 20.6 and 19.5 years respectively than the selected countries in sub-Saharan Africa.

If our assumption holds that married women are sexually active and do not contracept to delay first births, primary sterility does not seem to be a problem in Tanzania as only 1.4 percent of the women, married for 5 years and still living in the first union, are childless. This procedure however, might underestimate primary sterility in Tanzania, as never married women were not included. Perhaps some of them could not get married due to the fact that they are sterile. Since parenthood is the ultimate goal of marriage in Tanzania, primary sterility might be the cause of divorce for those who declared in the survey to be divorcees. However, only 13 percent of divorcees have never had any live birth. This topic is an area for further research.

Unsafe abortions to avoid premarital births are on the increase in sub-Saharan Africa. It was estimated that 26 out of 1,000 women have an abortion annually. Most of these abortions concern young women. The consequences of induced unsafe abortions can range from infertility to the death of these young women. Even in countries where abortion is not restricted, unsafe abortions are performed due to several factors ranging from the cost and accessibility of the service to poor women in rural areas. Legalising abortion does not seem to be the only solution for this problem. The main alternative is to provide family planning services not only to married but also to unmarried young women who are mostly adolescents. Moreover, juvenile women should be particularly encouraged to use modern contraceptives, especially condoms that have a dual means of function as a contraceptive method and as protection against STI/STD.

According to the 1996 TDHS, premarital first conceptions amount to 34 percent of all first births to ever married women in Tanzania. However, half of these women got married before the birth of their first child. Generally 41 percent of all first live births in Tanzania resulted from premarital pregnancies at the time of conception. Out-of-wedlock births accounted for 24 percent of all first births. Births to single mothers at the time of the survey accounted for 30 percent of all out-of-wedlock births; 70 percent of all mothers who gave birth out of wedlock in the past were eventually married at the time of survey. This is an indication that the old norm of premarital virginity has lost its importance in Tanzania. It seems that nowadays fecundity is a prerequisite of marriage instead of men

insisting on premarital virginity. This is confirmed by the fact that out of all women with a premarital conception only 17 percent were still unmarried at the time of the survey. However, from the data we cannot conclude whether these women married the father of their first child or somebody else. Out of wedlock births have been slightly on the increase in Tanzania as the 1991/92 TDHS recorded 22 percent of all births to be out of wedlock while the 1996 TDHS recorded 24 percent.

It was found that current age and age at first intercourse are positively related to age at first motherhood. Age at first intercourse and education were found to be major factors determining age at first birth for Tanzanian women. This suggests that in the absence of contraception in delaying first unwanted births, delaying first intercourse might raise the age at first birth. However, it is not plausible to formulate a policy to delay first sexual intercourse. This means early age at first birth will continue to be a problem unless the use of contraception to delay first birth is promoted among adolescents. On the other hand, this study has revealed that encouraging women to spend more years in school will have an impact on age at first birth. As long as pregnant girls are not allowed into school, many juvenile schoolgirls will refrain from having sexual relationships. Changing the regulation that pregnant schoolgirls must be expelled from school might result in more premarital births, lower age at first birth and eventually a rise in fertility. The proprietors of the abolishment of this law should first concentrate on raising contraceptive use among adolescents, and then the abolishment of this law should follow. The most important thing should be to avoid unwanted pregnancies for schoolgirls and other adolescents. In the US, where pregnant schoolgirls are allowed to continue with schooling, it is documented that only about 3 in every 10 adolescent mothers ultimately obtain a high school diploma by the age of 30.[42] Therefore if this system is adopted in our society, the chance of achieving the intended goal is very slim.

Moslems have a slightly lower age at first birth in comparison to women of other religious affiliation. It was also found that Moslem women are more likely to have a premarital birth than other believers. Therefore Moslem leaders should try to encourage their followers to use contraceptives in preventing premarital conceptions and early motherhood by discouraging early marriage. Bivariate and multivariate analyses show a

[42] From *www.cfoc.org/factsheet.html* of April 1997.

higher age at first birth for Catholics than for others. Education was found to be strongly related to age at first birth. Secondary school leavers have a higher age at first birth than others while women without education have the lowest age at first birth. Women residing in Dar es Salaam have the lowest age at first birth compared to women residing in other parts of Tanzania i.e. Dar es Salaam women have lower age at first birth than women in rural areas. Urban residents living in other towns than Dar es Salaam have the highest age at first birth. A study should be conducted to look at specific factors that make Dar es Salaam women start child bearing at an earlier age despite being the capital city. The NFPP should put emphasis in these areas.

The study found that age at first birth is inversely related to fertility as those women who start their child bearing early have higher fertility. Women with late age at first birth also have lower fertility. Although late age at child bearing has also been found in this study to be a factor in reduced levels of fertility, and ultimately population growth, Pebley (1981) found that differences in age of entry into motherhood under age 20 have relatively little effect on completed fertility. Hobcraft and Casterline (1983) also observed that a postponement of child bearing until at least age 20 is necessary before substantial effects on fertility could be observed. This was clearly confirmed in this study (Table A- 3).

Age at first birth can be associated with child survival for the first births. Children born to women experiencing first births before 15 years of age are at a greater risk of infant and child mortality than those of women who had their first births when they were older than 20 years. However, infant deaths to these mothers cannot simply be explained by biological factors but are closely linked to socio-economic factors. Early age at first motherhood is also associated with a higher risk of maternal deaths, but this need to be further investigated.

In Chapter 5 we tried to associate findings of Chapter 4 with fertility in Tanzania. According to the 1996 TDHS it was found that on average a Tanzanian woman bears 5.6 children until the end of her child-bearing years. This level of fertility is still very high in comparison with other countries in the developing world. However, some decline in fertility has been observed during the recent past. The 1978 population census data give a TFR of 7.4, the 1988 census gives a TFR of 6.5. The 1991/92 TDHS data give TFR of

6.1. Therefore, it can be concluded that the Tanzanian fertility has declined by about 2 children per woman from the late 1970s to the mid-1990s. This can be regarded as a substantial decline in fertility.

This study gives evidence that any change in the level of fertility is necessarily related to changes in one or more proximate determinants. The two major proximate determinants of fertility in Tanzania are universal and prolonged breastfeeding through its effect on postpartum infecundability, and marriage. As it is in many other sub-Saharan Africa countries, the use of contraception is not widespread in Tanzania. Therefore, its effect in reducing fertility is minimal. Unfortunately, the importance of induced abortions, as a fertility-inhibiting variable could not be assessed in this study because of the non-availability of data. Abortion is likely to affect the estimation of the total fecundity rate as the number of induced abortions is known to be rising in Tanzania (Justesen et al., 1992; Mpangile et al., 1993).

Bongaarts and Potter (1983) argued that the transition of fertility decline could easily be explained by the transition of a population from natural to controlled fertility. In this study it was established that the TFR declined by 8.2 percent between 1991/92 and 1996. The proportion of women married decreased, the duration of postpartum infecundibility shortened, and contraceptive practice increased. From these findings, we can conclude that Tanzania’s demographic reproduction is changing from natural fertility to more controlled fertility, hence is in the transition of declining. The underlying factor obviously is the willingness and ability of a growing number of women to limit the number of their children and to increase the period between births.

The analysis of the determinants of the number of children ever born suggests that the decline in fertility in the recent past is a result of a rise in age at first birth and age at marriage, and a decline in infant and child mortality. It has been observed that women in monogamous marriages have a higher fertility than women in polygamous marriages even after controlling for other variables. Similar results were found by Henin's (1979) study on Tanzania. This is likely to be due to the fact that women in polygamous marriages have a reduced frequency of sexual intercourse compared with women in monogamous marriages.

There is a strong relationship between age at first birth and the lifetime fertility of a woman. This study found that starting having children at age 20 to 21 reduce the number of children they were expected to have by one birth less compared to those who started child bearing before attaining age 15. Women who become mothers only after attaining age 25, get almost 3 children less compared to those who start child bearing before age 15. Infant mortality also plays a role. Women who lost one or more children have a higher number of children ever born than those without any loss. It seems that almost each child who died is being replaced by another birth. This means child survival will directly reduce fertility.

Women who experience their first sexual intercourse within marriage have higher fertility compared to those who had the same experience before marriage. Marriage after age 25 reduces the number of children a woman might bear by almost one child in comparison with the number of children of a woman who marries before attaining age 15. This implies that a policy which would raise age at first marriage will have an impact on fertility. Currently married women have higher fertility than those who are not married.

Education plays a big role in reducing fertility. Completing primary education reduces the number of children a woman would have in comparison with those who did not attend school. However, secondary education seems to have a non-linear relationship with the number of children ever born; it is not statistically significant.[43] The partner's educational level also influences the cumulative fertility of a woman. This might be due to the fact that most of educated women would not prefer to be married to uneducated men. A result of the partner's education is highly correlated to the level of education of a woman. From this study we can conclude that raising a woman's educational level would raise her age at first intercourse since schoolgirls are less likely to become mothers due to strict rules on pregnancy in schools. In general, education raises women's age at first birth, reduces infant and child deaths, improves women's social status, and creates an additional incentive to use modern contraceptives.

[43] The question about education level in the TDHS could have been interpreted wrongly in Kiswahili. It seems that those women who attended informal education were coded as if they attended formal schools. This was concluded from the fact that some women either got married or had birth before attaining age 15 while they were categorised as having completed secondary education.

It was found in this study that Moslems bear children at an earlier age compared with Catholics. But it is interesting to note that Moslem women have a slightly smaller number of children ever born in comparison to Catholic women. This was also confirmed in the analysis done in this study of women in Moslemic countries like Egypt, Bangladesh, and the Comores who tend to bear children early but have a relatively lower fertility. This might be attributed to the restrictions of Catholics on the use of contraceptives. Although rural women were found to have higher age at first birth than urban women, urban residents have a smaller mean number of children ever born than rural women. These two findings suggest that early age at child bearing is an important factor in influencing fertility for a society with low contraceptive prevalence. However, age at first motherhood cannot have an effect on fertility if the majority of women are effectively contracepting.

In Chapter 4 we found that women in Tanzania use contraceptives to delay their first births. This result contradicts the conventional knowledge that women in Tanzania use contraceptives only for spacing or limiting purpose. It was found that 14 percent of unmarried women are doing something to delay or avoid premarital pregnancies and 9 percent use modern methods of contraception. These women use mostly condoms to avoid pregnancies and to protect themselves from STDs. However, in Chapter 6 we examined levels and determinants of contraceptive use in Tanzania to space or limit the number of births. Women were analysed in two separate groups: never married women and currently married women. The 1996 TDHS reveals that 13.3 percent of the currently married women and 5.6 percent of the never married women were using modern contraceptives at the time of interview. However, 15.3 percent of non-pregnant, currently married women use contraceptives and 5.8 percent of non-pregnant never married women contracept. These levels are very low compared with the level of knowledge of at least one method of contraception that is 88 percent for currently married women and 70 percent for never married women. Mturi and Hinde (1994), by using the 1991/92 TDHS, estimated that 10.4 percent of the currently married women and 5.9 percent of the never married women use contraceptives in Tanzania

Family planning methods are mainly used for spacing purposes in Tanzania; the pill being the leading method followed by injections. While female sterilisation is more common among older women, the condom is popular among younger women. This might be associated with the campaign of HIV/AIDS prevention. It is interesting to note that

periodic abstinence is more popular among younger women, while other traditional methods like strings are only used by older women. The use of condoms was stated to be the second most popular modern method (after the pill) among never married women. It is interesting to note that periodic abstinence is popular among never married women too. This suggests a lack of family planning services offered to these women. Unmarried women used not to have access to family planning services. Although the government has tried to reverse its policy concerning these women, it is still difficult for a teenage schoolgirl or an adolescent in general to visit a family planning clinic. Furthermore, the integration of MCH-services and family planning services complicate the accessibility of these crucial services to unmarried women especially those who have never given birth. MCH is considered by the society as a service for mothers and children, and family planning services are for spacing and limiting births rather than preventing first births. Another hindrance of the accessibility of family planning services to juvenile and unmarried women generally is the conservativeness of the staff members in family planning clinics. They follow the unwritten rule that family planning advice can be given only to married clients who have a child. On the other hand, staff members often have negative attitudes towards modern contraceptives such that they portray a bad example to their clients. Furthermore, there are common reservations that contraception to childless women leads to primary and secondary infertility. Due to misconceptions about contraceptives being numerous which inhibit their use, there is a need for better counselling as well as a need for an improvement and update of the education of counsellors and service providers of family planing services. Nevertheless it is essential for the NFPP to focus more on young and unmarried women since premarital sexuality and child bearing seem to be a serious problem in Tanzania (see Chapter 4).

The determinants of contraceptive use in Tanzania as found in this study are very similar to those found elsewhere in the developing world. It can be concluded that Catholic rural women, with less than 7 years of schooling, married to a men with less than 7 years of schooling, involved in polygamous marriages or unions are the least likely to use any method of contraception. Unmarried illiterate adolescent women in rural areas, and young non-Moslems are also less likely to use contraception than other unmarried women. All these women need to be given special attention by the NFPP in order for the contraceptive acceptance rate in Tanzania to rise.

This study also dealt with unmet need and the demand for family planning (see Chapter 6). A major focus was to examine the proportion of women who are exposed to the risk of unwanted pregnancy but are not practising contraception. In most societies this has been a very serious problem since the impact of unmet need on fertility over a period of time may be very significant even if the magnitude of unmet need at any point in time is small. The method developed by Westoff (1988) and later adopted as DHS methodology (Westoff and Ochoa, 1991) was applied to investigate the unmet need for family planning for Tanzanian women.

The total unmet need was estimated to be 27.5 percent among currently married women. Most of these women have an unmet need for spacing births (15.7 percent) rather than for limiting births (11.8 percent). The total demand for family planning in Tanzania is therefore 40.8 percent by including the percentage of women who are currently contracepting. It was found that in Tanzania the probabilities of having an unmet need for spacing is much higher than that for limiting. However, women who were married before age 15 and women aged 35 years and above have high probabilities of having an unmet need for limiting fertility. Women observed to have the highest probability of having an unmet need for spacing are rural Moslem adolescents in monogamous unions who have at least one living child, and having completed primary education. Women with the highest probabilities of having unmet need for limiting include married women who have a larger number of surviving children and live in a rural setting.

In Chapter 7 we concentrated on adolescents who are a very important segment of the Tanzanian population. Our main focus was sexual activity and child bearing before first marriage. Its consequences range from terminating their education, which results in lowering their social status, and it sometimes leads to the death of the young mother as their reproductive organs are not mature yet. Furthermore, children born out-of-wedlock to adolescent mothers are generally severely disadvantaged because their mothers tend to be illiterate, poor, and in a poorer health condition than others.

We observed a high rate of first premarital adolescent pregnancies among all adolescent women in Tanzania (47 percent). Some 12.2 percent of adolescents who became pregnant out-of-wedlock got married before the birth of their first child; 6.6 percent got married after the birth of their first child, and the remaining 28.3 were still not married

at the time of the survey. The study found that premarital first pregnancies were prevailing in most sub-Saharan Africa countries. For example this study found that, in Kenya 72 percent of all adolescent births were conceived as premarital pregnancies, 16 percent got married during the first pregnancy. In all adolescent first births in Kenya, 44 percent of all young mothers (15-19) were singles at the time of the survey, 42 percent in Côte d'Ivoire, 28 percent in Tanzania, and 25 percent in Zambia.

In this study we found that literate adolescent women had a higher likelihood of having premarital sexual intercourse than illiterates. However, literacy raises age at first birth for adolescents. Literate adolescents, on the other hand, are more likely to be displeased with the timing of their first birth than illiterate adolescent women. The more years an adolescent attends school, the higher the age at first birth. Urban adolescent woman had a higher likelihood to experience premarital sexual intercourse than rural adolescents. Protestant unmarried adolescent women are less likely to experience sexual intercourse compared to Moslems. Moslem adolescents have the first birth earlier than Christians.

Sub-Saharan Africa countries are characterised by low contraceptive prevalence (see Appendix A1). Low TFR can be associated with a high contraceptive prevalence rate. Countries like Kenya with low mean ages at first intercourse, marriage and birth have a lower TFR (less than 6) because its contraceptive prevalence rate is higher than 30 percent. It seems that countries with a prevalence rate of more than 40 percent have a TFR of less than 5. This is true even for other selected developing countries analysed in this study.

This study tried to develop a model that can be used to study fertility in Tanzania based on the findings in this study (Chapter 2). By using this model we found that in Dar es Salaam age at first intercourse influences age at first birth. The increase of age at first sexual intercourse by 5 years leads to an increase in age at first birth for Moslems by 2 years, and for Catholics by 3 years. The increase of Moslems' education by 5 levels leads to a rise in age at first birth by 1 year. But for Protestants and Catholics in Dar es Salaam education is not a significant factor in raising age at first birth.

In urban centres, excluding Dar es Salaam, age at first intercourse also plays a significant role in explaining age at first birth. A rise in age at first sexual intercourse by

5 years results in an increase of 3 years in age at first birth for Moslems and Protestants. The same increase of 5 years in age at first sexual intercourse raises Catholics' age at first birth by 3.5 years. Education also plays a significant role in raising age at first birth for Moslems. For urban Moslems, an increase by 5 levels of education raises age at first birth by 1 year. However, for Protestants an increase of 10 levels of education raises age at first birth by only 1 year. For Catholics, educational levels are not a significant factor in raising age at first birth.

In rural areas, age at first sexual intercourse plays a significant role in raising age at first birth. An increase of age at first sexual intercourse of 5 years raises age at first birth by 1.5 years for Moslems, 2.0 years for Catholics and 2.5 years for Protestants. Education although significant for Moslems and Catholics in rural areas, it does not play a big role since an increase of 10 levels of education raise age at first birth by 1.0 year.

Therefore, it can be concluded that a rise in the age at first sexual intercourse plays a significant role in delaying age at first birth for Tanzanian women, while education, when controlling for all other factors plays a smaller role mainly in urban areas but not in rural areas.

On the part of fertility, age at first birth and child loss explains excess fertility for Moslems in Dar es Salaam. The number of children ever born decreases with increasing age at first birth. Women who started child bearing at age 20-21 have almost 2 births less than those who had their first birth before attaining age 15. Those who start child bearing above 24 years of age have almost 4 births less than those who started their child bearing when they were younger than 15 years of age. Child survival also plays an important role.

In urban areas, raising age at first marriage decreases the number of children ever born. Raising age at first marriage between age 22 to 24 decreases the number of children ever born by 1.3 compared to those who got married with less than 15 years. Those who marry with more than 24 years have 2 births less than those who got married when they were younger than 15 years old. Late age at first birth for Moslems and somehow for Catholics plays a significant role in reducing the number of children a woman will bear

during her lifetime. Catholic women in polygamous unions have lower fertility compared to women in monogamous unions.
In rural areas age at first marriage of more than 24 years reduces the number of children ever born to a woman by one birth for all women regardless of the religion they belong to. Again, age at first birth and child loss explain the excess fertility of women in rural areas. It seems that Catholics and Protestants in polygamous unions have a lower fertility in comparison with those who live in monogamous unions.

8.2. Policy Implications

This study attempted to shed some light on Tanzanian fertility and the related aspects. The individual level analysis carried out has answered a number of questions on the levels, trends, and determinants of fertility in Tanzania. A very clear point from this study is that fertility in Tanzania is still high but has started to decline. The effort by the government to encourage a reduction of fertility among the Tanzanian people should be supported fully so as to reduce the population growth rate. The imbalance between population growth and economic growth in Tanzania has been discussed in Chapter 1.

In this study, we have found that most women in Tanzania start child bearing during adolescence. We further found that out-of-wedlock child bearing increases as the age at first marriage have been increasing. Moreover, a substantial proportion of pregnancies and births to these adolescents are mistimed or unwanted. Adolescents often resort to unsafe, clandestine abortions as a means to end unwanted pregnancies. This study pointed out problems of increasing premarital sexual activity with its consequences: the spread of sexually transmitted diseases, premature termination of schooling, high abortion rates that result to some extent from the necessity to hide an unintended conception in order to continue schooling, and the economic and social consequences of early child bearing as documented in this study. However, even married adolescents face many health problems which are exacerbated by customs that are culturally embedded, such as marriage at or close to puberty. This means there is a need to give attention to the health and wellbeing of adolescents.

The need for policy initiatives that increase educational opportunities is especially great among juvenile women who are poor and are therefore more likely to leave school,

marry and begin child bearing at an earlier age than better-off adolescents. The difficulty of implementing policies that promote change in the behaviour of people and broaden their opportunities cannot be underestimated. Yet, it is imperative for governments, communities, and families to take responsibility for and actively work toward creating an environment that will enable and inspire young people to better themselves and the environment surrounding them.

The study has revealed a positive relationship between age at first birth and fertility. Raising the age at which women start child bearing will lower fertility. However, legislation on raising age at first birth might not sound plausible. However, this study found the relationship between age at first sexual intercourse and marriage (for those whose first sexual intercourse follows marriage) to be positively related with age at first birth. The only way to raise age at first birth is to encourage the use of and give access to contraceptives to young married as well as to unmarried women. Adolescents are aware of contraceptives (81.0 percent). In contrast, very few use contraceptives (7.2 percent). Furthermore, even fewer of the unmarried, sexually active adolescents report using condoms (4.5 percent). This suggests that few sexually active adolescent women are protected from sexually transmitted diseases and HIV/AIDS. The use of condoms must be promoted not only as prevention against STD/STI but also because adolescents might experience provider bias, particularly against methods that are thought to impair future fertility. Hence, further studies must be carried out to understand factors that prevent adolescents from using modern methods of contraception, especially condoms.

We also found that there is the societal expectation that marriage is an institution of childbirth.[44] The only way to raise the age at first marital births is to increase the age at marriage. The government should come up with well-defined policies that will directly or indirectly raise the age at first birth by strengthening the legislation on age at marriage. More efforts should be directed towards the improvement of the status of women. This can be done through improving female education. More vocational training and secondary schools for girls should be provided in all parts of the country.

[44] After the first few months of the first marriage close relatives in Tanzania will start asking ‘ndoa imejibu?’ which literally means ‘has the marriage answered?’ or in other words ‘is the newly married woman pregnant?’. From the fact that people start asking whether the newly married woman is pregnant, one can see that many people still consider marriage as the initiation of parenthood.

This will motivate girls to continue with secondary education rather than dropping out of school. Those who fail to continue with secondary schooling should have the possibility to join vocational training for not less than 3 years. In doing so, women will stay in school for a longer time and therefore delay marriage and subsequently first birth.

Traditionally initiations helped to give sexual education to adolescents. However, today young women are caught at cultural cross roads due to the gradual disappearance of traditional values. Older women no longer give guidance to girls as far as sexual matters are concerned. The traditional initiations (*Unyago*) have been given up in many parts of the country, especially in urban areas. Yet the governmental organisations, the church and non-governmental organisations involved in family planning are reluctant to incorporate the youth in their programmes due to social norms which define a 'good woman' as one who is ignorant about sexuality and sexually passive. This comes about due to an assumption that communication about sexuality and birth control is strongly influenced by young women's perception of how socially acceptable their knowledge about sexuality is. In this respect, a young woman may be unwilling to ask questions concerning sexual intercourse and child bearing. Therefore, there is a need for family life education programmes. These could be integrated into the school curriculum. They could also be extended to cater for those girls who have no opportunity of being in the school system due to a lack of money. Family life education therefore can be extended to these groups of people through youth camps, trade centres, women associations and community centres.

The study has also shown that various sub-groups of the population are less disadvantaged in terms of controlling their reproductive patterns. The level of awareness of family planning methods is high but few women are actually using contraceptives. The NFPP has the task to provide family planning services to all those who need them. If every woman, who is a potential contraceptive user, is offered the facilities, the contraceptive prevalence rate will rise to at least 41 percent. The total demand for delaying first birth was also found to be 41 percent. It seems therefore that the majority of motivated women do not have access to the family planning services in order to delay, space, or limit their births. As an initial step, this group of women should be targeted.

The issue of unmarried women too should be addressed more critically since most of these women are sexually active. As documented in this study, more than 50 percent of unmarried adolescents are sexually experienced and only 6.7 of the sexually active adolescents contracept. In this study we found a high prevalence of premarital sexuality which results in an increasing rate of premarital child bearing. As noted earlier, these women are still not free to use contraceptives even if they want to. The perception of family planning service providers (particularly MCH and UMATI staff members) that family planning services are for married women only should be very strongly criticised. There is a need to improve and update the education of the family planning staff.

Different ways of motivating young women, who are sexually active, to use contraception should be developed. Among the first attempts perhaps should be to introduce sex education in primary and secondary schools. The second step is to create an environment suitable for these unmarried women to access family planning services easily. The provision of family planning services to unmarried women should be separated from MCH clinics since the definition (Maternal and Child Health) does not include women who are not pregnant nor have ever given birth. Youth centres and groups can offer family planning services for unmarried women.

This study found that adolescent sexual activity and premarital sexual activity are a fact of life in Tanzania as is the case in many Western societies. In such a situation, it is necessary to educate juvenile women about the responsibilities associated with sexual activity and the potential consequences. Therefore, politicians and religious leaders should be sensitised in order to change their negative attitude towards the introduction of sex education in schools. A thorough study should be carried out to incorporate traditional sexuality education (initiations) with the proposed sex education in schools in order to mix culture and modernisation.

Initiators known as '*Walombo*' should also be sensitised in order to appreciate methods of modern contraception. Eventually they might become proprietors of family planning in their role as traditional sex educators in places where this culture still exists as not all parts in Tanzania used to have this kind of set-up.

Although breast-feeding practice contributed to the decline in fertility in Tanzania, the study found that there was a shortening of the duration of breastfeeding practice between two TDHSs. This has to be compensated with greater contraceptive use for a further decline of fertility in Tanzania. The government on the other hand should continue to encourage women to breastfeed their children for a longer duration along with contraceptive use.

8.3. Further Work

There are various areas that need further research. This study has highlighted Tanzanian fertility at the national-level. Many issues discussed therefore need further analysis to obtain a better understanding of the reproductive behaviour of Tanzanian women. The onset of the fertility transition observed in this study is by no means conclusive. Efforts should be made to confirm the magnitude of fertility decline and the factors responsible for this decline. There is a need to use prospective data for this purpose. Since regional variations in fertility are obvious, a thorough understanding as to why there are differences between the regions should be addressed. This will assist planners and policy makers to distribute the limited resources adequately.

In this study, we had a shortage of variables in investigating age at first birth due to the fact that many important questions were not asked in the TDHSs. In the forthcoming TDHS in 1999, this study recommends that questions should be include about age at menarche, abortion, use of contraceptives before first birth, and socio-economic characteristics of the respondent before her first birth. Studies on maternal mortality due to first births, and primary sterility will supplement this study for updating of our national population policy.

It has been stated that the rationale for providing family planning services in Tanzania is to improve the health of mothers and children. The present study has examined only one aspect, i.e. the determinants of contraceptive use and unmet need. It will be interesting to examine the relationship between infant mortality rates, maternal mortality rates and family planning policies. This area has not received much attention in the literature because of a lack of data on maternal mortality. But, there is a chance that family planning programmes are effective in reducing maternal mortality rates, and improving

child survival. It is particularly important to investigate whether a reduction of higher parity births, and lower and higher maternal age at first births have any impact on maternal mortality.

9. References

Abou-Gamrah, H. (1976): Methods of Adjusting the Stable Estimates of Fertility for Effects of Mortality Declines. *Population Studies* 30(1):165-170.

Abou-Gamrah, H. (1982): Fertility levels and Differentials by Mother's Education in Some Countries of the ECWA Region. In: *Duration of Fertility in Some African and Asian Countries*, CDC, Cairo.

Acsadi, G.T.F., G. Johnson-Acsadi and R.A. Bulatao (eds.) (1990): *Population Growth and Reproduction in Sub-Saharan Africa*. A World Bank Symposium. Washington, D.C.: World Bank.

Adeokun, L.A. (1990): Research on Human Sexuality in Pattern II Countries. In Ammy Chouinard and Jacques Albert (eds.), Human Sexuality: Research Perspectives in a World Facing AIDS. Background papers and reports of a workshop held at International Development research Centre, Ottawa, Ontario, Canada, June 1989.

Adewole, I.F. (1992): Trends in Postabortal Mortality and Morbidity in Ibadan, Nigeria. *International Journal of Gynecology and Obstetrics* 38(2):115-118.

Aggarwal, V.P. (1984): Septic abortion: Management and prevention. In: Mati, J.K.G., O.A.Ladipo, R.T. Burkman, R.H. Magarick, and D. Huber, eds (1984): Reproductive health in Africa.

Aggarwal, V.P. and J.K.G.Mati (1982): Epidemiology of induced abortion in Nairobi, Kenya. *Journal of Obstetrics and Gynaecology of Eastern and Central Africa* 1:54-57.

Ahmed, J. (1986): Polygyny and Fertility Differentials among the Yoruba of Western Nigeria. *Journal of Biosocial Science*, 18(1):63-73.

Alan Guttmacher Institute (AGI) (1994): *Clandestine abortion: A Latin American reality.* New York, AGI.

Anarfi, J.K. (1990): Sexual Networking in Some Selected Societies in Ghana and the Sexual Behaviour of Ghanian Female Migrants in Abidjan, Côte d'voire. Paper presented at the IUSSP Seminar on Anthropological Studies Relevant to the Sexual Transmission of HIV, Sonderborg, Denmark; November 19-22.

Archibong, E.I. (1991): Illegal induced abortion, a continuing problem in Nigeria. *International Journal of Gynaecology and Obstetrics* 34(3):261-265.

Arnold, F. (1991): An Assessment of Data Quality in the Demographic and Health Surveys. *Demographic and Health Survey World Conference*, August 5-7, Washington, D.C. Proceedings, volume II:785-806.

Arnold, F. and A.K. Blanc (1990): Fertility Levels and Trends. *Demographic and Health Surveys Comparative Studies* no. 2. Columbia, Maryland, USA: Institute for Resource Development/Macro Systems.

Arriaga, E.E. (1983): *Estimating Fertility from Data on Children Ever Born by Age of Mothers*. ISP-RD-II

Bauni, E.K. (1990): The Changing Sexual Patterns of the Meru People of the Chogoria Region, Kenya. Paper presented at the IUSSP Seminar on Anthropological Studies Relevant to the Sexual Transmission of HIV, Sonderborg, Denmark, November 19-22.

Begg, C.B. and R. Gray (1984): Calculation of Polychotomous Logistic Regression Parameters Using Individualized Regressions. *Biometrica*, 71(1):11-18.

Bertrand, J.T., E.K. Bauni, R.J. Lesthaeghe, M.R. Montgomery, O. Tambashe, and M.J. Wawer (1993): *Factors Affecting Contraceptive Use in Sub-Saharan Africa*. Washington D.C.: National Academy Press.

Bicego, G. and J.T. Boerma (1993): Maternal and Child Survival: A Comperative Study Data from 17 Countries. *Social Science and Medicine* 36(9):1207-1227.

Blanc, A.K. and N. Rutenberg (1990): Assessment of the Quality of Data on Age at First sexual Intercourse, Age at First Marriage, and Age at first Birth in the Demographic and Health

Surveys. *An Assessment of DHS-I Data Quality*, 41-79. DHS Methodological Reports, No.1. Columbia, Maryland: Institute for Resource Development/Macro Systems, Inc.

Bloom, D and P.H. Reddy (1986): Age Patterns of Women at Marriage Cohabitation and First Birth in India. *Demogroaphy* 23(4):509-521.

Blum, R.W. (1991): Global trends in adolescent health. *Journal of the American Medical Association* 265(20):17-27.

Bongaarts, J. (1978): A Framework for Analysing the Proximate Determinants of Fertility. *Population and Development Review*, 4(1):105-132.

Bongaarts, J. (1981): The Impact on Fertility of Traditional and Changing Child Spacing Practices. *Child-Spacing in Tropical Africa: Traditions and Change*. H.J. Page and R. Lesthaeghe (eds.):111-129. London: Academic Press.

Bongaarts, J. (1982). The Fertility-Inhibiting Effect of the Intermediate Fertility Variables. *Studies in Family Planning*, 13(6/7):179-188.

Bongaarts, J. (1987): Does Family Planning Reduce Infant Mortality Rates? *Population and Development Review*, 13(2):323-334.

Bongaarts, J. (1988): Does Family Planning Reduce Infant Mortality? *Population and Development Review*, 14(1):188-190.

Bongaarts, J. (1991): The KAP-Gap and the Unmet Need for Contraception. *Population and Development Review*, 17(2):293-313.

Bongaarts, J. and O. Frank (1988): Biological and Behavioural Determinants of Exceptional Fertility Levels in Africa and West Asia. *African Population Conference*, volume 1: 2.1.1-2.1.13. Dakar, Senegal: IUSSP.

Bongaarts, J. and R.G. Potter (1983): *Fertility, Biology and Behaviour: An Analysis of the Proximate Determinants*. New York: Academic Press.

Bongaarts, J., O. Frank and R. Lesthaeghe (1984): The Proximate Determinants of Fertility in Sub-Saharan Africa. *Population and Development Review*, 10(3):511-537.

Booth, H. (1979): *The Estimation of Fertility from Incomplete Cohort Data by Means of the Transformed Gomperts Model.* Ph.D. Thesis, University of London, London.

Boserup, E. (1985): Economic and Demographic Interrelationships in Sub-Saharan Africa. *Population and Development Review*, 11(3):383-397.

Boulier, B.L. (1984): *Evaluating Unmet Need for Contraception: Estimates for Thirty-Six Developing Countries*. World Bank Staff Working Papers, No. 678. Washington, D.C: World Bank.

Bradley, J., K. Rogo, R. Johnson, L. Okoko, J. Healy, and J. Benson (1993): A comparison of the costs of manual vacuum aspiration (MVA) and evacuation and curettage (E&C) in the treatment of early incomplete abortions in Kenya. *Journal of Obstetrics and Gynaecology of Eastern and Central Africa* 11:12-19.

Bradley, J., N. Sikazwe, and J. Healy (1991): Improving abortion cares in Zambia. *Studies in Family Planning* 22(6):391-394.

Brass, W. (1964): Uses of Census or Survey Data on the Estimation of Vital Rates. Paper prepared for the African seminar on vital statistics, Addis Ababa: UN Economic Commission of Africa.

Brass, W. (1967): *The Demography of Tropical Africa.* Princeton University Press, Princeton, USA.

Brass, W. (1980): Screening Procedures for Detecting Errors in Maternity History Data. Occasional papers *in Regional Workshop on Techniques of Analysing WFS data*. International Statistical Institute, Voolburg, Neltherlands.

Brass, W. (1981): The Use of Relational Gompertz Model to Estimate Fertility. *Proceedings of the IUSSP Conference*. Manila.

Brass, W. (1983): The use of the Gompertz Relational Model to Estimate Fertility. *International Population Conference*, IUSSP, Manila.

Brass, W. and C.L. Jolly (1993): *Population Dynamics of Kenya*. Washington D.C.: National Academy Press.

Briggs, J. (1993): Population Change in Tanzania: A Cautionary Note for the City of Dar es Salaam. *Scottish Geographical Magazine*, 109(2):117-118.

Brunborg, Helge (1983): An Economic Model of Fertility, Sex and Contraception. *Unpublished Ph.D. Dissertation in Economics*. University of Michigan.

Buck, C., and K. Stavraky (1967): The Relationship Between Age at Menarche and Age at Marriage among Child bearing Women. *Human Biology* 39:93.

Bulatao, R.A. (1984): Reducing Fertility in Developing Countries: A Review of Determinants and Policy Levers. *World Bank Staff Working Papers*, number 680. Washington, D.C.: World Bank.

Bulatao, R.A. (1989): Toward a Framework for Understanding Contraceptive Method Choice. *Choosing a Contraceptive: Method Choice in Asia and the United States*, R.A. Bulatao, J.A. Palmore and S.E. Ward (eds.):277-304. London: Westview Press.

Bulatao, R.A. and R.D. Lee (1983a): An Overview of Fertility Determinants in Developing Countries. *Determinants of Fertility in Developing Countries: Fertility Regulation and Institutional Influences*, R.A. Bulatao and R.D. Lee (eds.):2:757-787. New York: Academic Press.

Bulatao, R.A. and R.D. Lee (1983b): A Framework for the Study of Fertility Determinants. *Determinants of Fertility in Developing Countries: Supply and Demand for Children*, R.A. Bulatao and R.D. Lee (eds.)1:1-26. New York: Academic Press.

Bumpass, L., R. Rifuss and R. Jonosik (1978): Age and Marital Status at First Birth and Pace of Subsequent Fertility. *Demography* 15(1):75-80.

Bumpass, L.L. and E.K. Mburugu (1977): Age at First Marriage and Completed Family Size. *Social Biology* 24(1):31-36.

Bureau of Statistics (1973): *1967 Population Census, Population of Tanzania.* United Republic of Tanzania, Tanzania.

Bureau of Statistics (1983): *1978 Population Census, The analytical volume.* United Republic of Tanzania, Tanzania.

Bureau of Statistics (1994): *1988 Population Census, National Profile.* United Republic of Tanzania, Tanzania.

Bureau of Statistics (Tanzania) (1989): *1988 Population Census: Preliminary Report*. Dar es Salaam: Ministry of Finance, Economic Affairs and Planning, United Republic of Tanzania.

Bureau of Statistics and Macro International Inc. (1993): *1991/92 Tanzania Demographic and Health Survey. Dar es Salaam*, Tanzania.

Bureau of Statistics and Macro International Inc. (1997): *1996 Tanzania Demographic and Health Survey. Dar es Salaam*, Tanzania.

Caldwell, J. (1976): Toward a Restatement of Demographic Transition Theory. *Population and Development Review*, 2(3/4):321-366.

Caldwell, J. (1977): The Economic Rationality of High Fertility: An Investigation Illustrated with Nigerian Survey Data. *Population Studies*, 31(1):5-27.

Caldwell, J. (1979): Education as Factor in Mortality Decline: An Examination of Nigerian Data. *Population Studies*, 33:395-413.

Caldwell, J. and P. Caldwell (1977): The Role of Marital Sexual Abstinence in Determining Fertility: A Study of the Yoruba of Nigeria. *Population Studies*, 31(5):201-211.

Caldwell, J. and P. Caldwell (1981): Cause and Consequence in the Reduction of Postnatal Abstinence in Ibadan City, Nigeria. *Child-Spacing in Tropical Africa: Traditions and Change*, H.J. Page and R. Lesthaeghe (eds.):181-199. London: Academic Press.

Caldwell, J. and P. Caldwell (1987): The Cultural Context of High Fertility in Sub-Saharan Africa. *Population and Development Review*, 13(3):409-437.

Caldwell, J., I.O. Orubuloye and P. Caldwell (1992a): Fertility Decline in Africa: A New Type of Transition? *Population and Development Review*, 18(2):211-242.

Caldwell, J., P. Caldwell and I.O. Orubuloye (1992b): The Family and Sexual Networking in Sub-Saharan Africa: Historical Regional Differences and Present-Day Implications. *Population Studies*, 46(3):385-410.

Caldwell, P. and J. Caldwell (1981): The Function of Child-Spacing in Traditional Societies and the Direction of Change. *Child-Spacing in Tropical Africa: Traditions and Change*, Hilary J. Page and Ron Lesthaeghe (eds.):73-92. London: Academic Press.

Casterline, J.B. and J. Trussell (1980): Age at First Birth. *WFS Comparative Studies*, No. 15. Voorburg, Netherlands: International Statistical Institute.

Castle, M.A., R. Likwa, and M. Whittaker (1990): Observations on abortion in Zambia. *Studies in Family planning* 21(4):231-235.

Cates, W., T.M.M. Farley, and P.J. Rowe (1985): Worldwide Patterns of Infertility: Is Africa Different? *Lancet* 2(8455):596-598.

Chandrasekhar, S. (1994): *India's abortion experience*. Denton Texas, University of North Texas Press.

Chaudhuri, S.K. (1992): Pregnancy termination. In: *Practice of fertility control: A comprehensive text book*. (3rd ed.) New Delhi, B.T. Churchill Livingston.

Cherlin, A. and N. Riley (1986): *Adolescent Fertility: An Emerging Issue in Sub-Saharan Africa.* PHN Technical Note 86-23. Washington, D.C.: The World Bank.

Chuwa, A. and A. Komba (1994): Fertility Levels, Patterns, Trends and Differentials. *1988 Population Census of Tanzania: The Analytical Report*, pp. 115-151. Dar es Salaam: Bureau of Statistics, The United Republic of Tanzania.

Chuwa, A.A., I.D. Diamond, A.J. Mturi, and A. Omari (1991): Fertility. The 1988 Census of Tanzania: An Initial Analysis. *Proceedings of a Workshop in Census Analysis and Population Projections*, Morogoro, United Republic of Tanzania: Population Planning Unit.

Cleland, J., N. Onuoha, and I. Timaeus (1994): Fertility Change in Sub-Saharan Africa: a Review of the Evidence. *The Onset of fertility Transition in Sub-Saharan Africa*, T. Locoh and V. Hertrich (eds.):1-20. Liège, Belgium: Ordina Editions.

Coale, A.J. (1981): Robust Estimation of Fertility by the Use of Model Stable Populations. *Asian and Pacific Census Forum* 8(2): 5-7.

Cochrane, S.H. (1979): Fertility and Education: What Do We Really Know? *World Bank Staff Occasional Papers*, number 26.

Cochrane, S.H. and S.M. Farid (1989): Fertility in sub-Saharan Africa: analysis and explanation. *World Bank Discussion Papers* (43). Washington, DC: World Bank.

Coeytaux, F.M. (1988): Induced Abortion in Sub-Saharan Africa: What We Do and Do Not Know. *Studies in Family Planning*, 19(3):186-190.

Cohen, B. (1993): Fertility Levels, Differentials, and Trends. *Demographic Change in Sub-Saharan Africa*, K.A. Foote, K.H. Hill and L.G. Martin (eds.):8-67. Washington, D.C.: National Academy Press.

Cox, D.R. (1972): Regression Models and Life Tables. *Journal of Royal Statistical Society*, Series B 34:187-220.

Cox, D.R. and D. Oakes (1984): *Analysis of Survival Data*. London: Chapman and Hall.

Croft, T. (1991): DHS Data Editing and Imputation. In *Proceedings of the Demographic and Health Surveys World Conference, Washington, D.C., 1991*. Vol.II, 1337-1356. Columbia, Maryland: Institute for resource Development/Macro International, inc.

Cross, A.R., W. Obungu, and P. Kizito (1991): Evidence of a Transition to Lower Fertility in Kenya. *International Family Planning Perspectives*, 17(1):4-7.

Curtis, S.L. and K. Neitzel (1996): *Comparative Knowledge, Use, and Sources.* DHS Comparative Studies No. 19. Calverton, Maryland: Macro International Inc.

Davis, K. and J. Blake (1956): Social Structure and Fertility: An Analytical Framework. *Economic Development and Cultural Change* 4(2):211-235.

DeLancey, V. (1990): Socioeconomic Consequences of High Fertility for the Family. *Population Growth and Reproduction in Sub-Saharan Africa*, George G.T. Acsadi, Gwendolyn Johnson-Acsadi and Rodolfo A. Bulatao (eds.):115-130. Washington, D.C.: World Bank.

Demographic and Health Surveys (1995): *DHS Newsletter*. Calverton, U.S.A.: Macro International Inc.

Demographic and Health Surveys (1997): *DHS Newsletter*. Calverton, U.S.A.: Macro International Inc.

Dennehy, E.B., C.A. Edward, and R.L. Keller (1995): AIDS education intervention utilizing a person with AIDS: Examination and clarification. *AIDS Education and Prevention* 7(2):124-133.

Desantis, L. and J.T. Thomas (1987): Parental attitudes toward adolescent sexuality: Transcultural perspectives. *Nurse Practitioner* 12(8):43-48.

Dixon-Mueller, R. and A. Germain (1992): Stalking the Elusive 'Unmet Need' for Family Planning. *Studies in Family Planning*, 23(5):330-335.

Dow JR., E. Thomas, L. Archer, S. Khasiani and J. Kekovole (1994): Wealth Flow and Fertility Decline in Rural Kenya, 1981-92. *Population and Development Review*, 20(2):343-364.

Durch, J.S. (1980): *Nuptiality Patterns in Developing Countries: Implications for Fertility.* Washington, D.C.: Population Reference Bureau, Inc.

Dynowski-Smith, M. (1989): *Profile of Youth in Botswana.* Intersectoral Committee on Family Life Education. Gaborone, Botswana: Government Printer.

Egero, B. and R.A. Henin (1973): Fertility. *The Population of Tanzania: An Analysis of the 1967 Population Census*, Volume 6, B. Egero and R.A. Henin (eds.):186-201. Dar es Salaam: BRALUP and Central Statistical Bureau. Dar es Salaam, Tanzania.

Ethiopia Country Paper (1994): Paper presented at the conference on Unsafe Abortion and Post-abortion Family Planning in Africa, Maritus, 24-28 March.

Farley, T.M.M., and E.M. Besley (1988): The Prevalence and Aetiology of Infertility. In *African Population Conference, Dakar 1988*. Vol.1, 2.1.15-30. Liege, Belgium: International Union for the Scientific Study of Population

Finnas, F. and J.M. Hoem (1980): Starting Age and Subsequent Birth Intervals in Cohabitational Unions in Current Danish Cohorts, 1975. *Demography* 17(3):275-295.

Ford, K. (1984): Timing and Spacing of Births. *WFS Comparative Studies*, No. 38. Voorburg, Netherlands: International Statistical Institute.

Frank, O. and G. McNicoll (1987): An Interpretation of Fertility and Population Policy in Kenya. *Population and Development Review*, 13(2):209-243.

Freedman, R. (1986): Fertility Determinants. In Cleland and Scott (eds.):25-74, *World Fertility Survey: An Assessment of its Contribution*. London: Oxford University Press.

Freedman, R. and A.K. Blanc (1991): Fertility Transition: An Update. *Demographic and Health Surveys World Conference*, August 5-7. Washington, D.C. Proceedings, volume I:5-24.

Freedman, R. and D. Freedman (1989): The role of Family Planning Programs as a Fertility Determinant. Seminar on the role of Family Planning Programs as a Fertility Determinant, IUSSP, Tunis.

Gage, A.J. (1986): Child Spacing and Fertility in Greater Freetown, Sierra Leone. *Unpublished M. Phil Thesis*, RIPS University of Ghana.

Gage, A.J. (1995): An assessment of the quality of data on age at first union, first birth, and first sexual intercourse for phase II of the Demographic and Health Surveys Program. Occasional Papers. Calverton, Maryland, Macro International Inc.

Gage-Brandon, A. and D. Meekers (1992): Sexual Activity among the Unmarried in Sub Saharan Africa. Paper prepared for the annual Meeting of the Population Association of America, Denver.

Gage-Brandon, A. and D. Meekers (1993): Sex, Contraception, and Child bearing Before Marriage in Sub-Saharan Africa. *International Family Planning Perspectives*, 19(1):14-18,33.

Gaisie, S.K. (1984): The Proximate Determinants of Fertility in Ghana. *WFS Scientific Reports* (53).

Garenne, M. and E. van de Walle (1989): Polygyny and Fertility among the Sereer of Senegal. *Population Studies*, 43(2):267-283.

Ghuhiya, A.I. (1993): Some Demographic and Socio-economic factors that affect Contraceptive Prevalence in Zanzibar. *M.A dissertation*, University of Dar es Salaam.

Goldman, N., L. Moreno, and C.F. Westoff (1989): *Peru Experimental Study: An Evaluation of Fertility and Child Health Information*. Princeton: Office of Population Research, Princeton University; and Colombia, MD: Institute for Resource Development/ Macro International Inc

Guz, D. and J. Hobcraft (1991): Breastfeeding and Fertility: A Comparative Analysis. *Population Studies*, 45(1)91-108.

Gyepi-Garbrah, B. (1985a): *Adolescent Fertility in Nigeria.* Boston: The Pathfinder Fund.

Gyepi-Garbrah, B. (1985b): *Adolescent Fertility in Liberia-Health and Social Implications*. Boston: The Pathfinder Fund.

Gyepi-Garbrah, B. (1985c): *Adolescent Fertility in sub-Sahara Africa.* Chestnut Hill, MA: The Pathfinder Fund.

Gyepi-Garbrah, B., D.J. Nichols, and G.M.K. Kpedekpo (1985): *Adolescent fertility in sub-Sahara Africa: An overview*. Boston, Pathfinder Fund.

Henin, R. A., D. Ewbank, and H. Hogan (1973): *The Demography of Tanzania: An Analysis of the 1973 National Demographic Survey of Tanzania*. Volume VI. Dar es Salaam, Tanzania: Bureau of Statistics (United Republic of Tanzania) and Bureau of Resource Assessment and Land Use Planning (University of Dar es Salaam).

Henin, R.A. (1979): *Effects of Development on Fertility and Mortality in East Africa: Evidence from Kenya and Tanzania*. Population Studies and Research Institute, University of Nairobi, Kenya.

Henshaw, S.K. (1990): Induced abortion: A world review, 1990. *Family Planning Perspectives* 22(2):76-89.

Henshaw, S.K. and E. Morrow (1990): *Induced abortion: A world review*. 1990 supplement. New York, Alan Guttmacher Institute.

Herz, B. and A.R. Measham (1987): *The safe motherhood initiative: Proposals for action*. Washington, D.C., World Bank.

Hinde, P.R.A. (1993): The Cox Regression Model in Surgical Research. *Tunisie Chirurgie*, II(2).

Hobcraft, J. and J.B. Casterline, (1983): *Speed of Reproduction*. WFS Comperative Studies, No. 25. Voorburg, Netherlands: International Statistical Institute.

Hobcraft, J. and J.W. McDonald (1984): Birth Intervals. *WFS Comparative Studies* (28).

I nternational Union for the Scientific Study of Population (IUSSP) (1988): *African Population Conference*, volume 1. Dakar, Senegal: IUSSP.

Jacobson, J.L. (1990): The Global Politics of Abortion. *Worldwatch Paper* No. 97. Washington, DC: Worldwatch.

Jacobson, J.L. (1994): Abortion and the global crisis in women's health. In: Mazur, L.A., ed. *Beyond the numbers: A reader on population, consumption, and the environment*. Washington, D.C., Island Press, 1994.

Jesani, A. and A. Iyer (1993): Women and abortion. *Economic and Political Weekly* 28(48):2591-2594.

Jolly, C.L. and J.N. Gribble (1993): The Proximate Determinants of Fertility. *Demographic Change in Sub-Saharan Africa*, Karen A. Foote, Kenneth H. Hill and Linda G. Martin (eds.):68-116. Washington, D.C.: National Academy Press.

Justesen, A., S.H. Kapiga, and A.G.A.H. van Asten (1992): Abortions in a Hospital Setting: Hidden Realities in Dar es Salaam, Tanzania. *Studies in Family Planning*, 23(5):325-329.

Kamau, R.K. (1990): Management of incomplete abortion: The role of manual vacuum aspiration. Presented at the Maternal and Perinatal Mortality Seminar, Mombasa, Kenya, Apr. 23-27.

Kamuzora, C.L. (1992): *Towards Understanding Low Contraceptive Prevalence in African Countries*. Paper presented at the third Demographic Unit annual seminar, July 9-11, University of Dar es Salaam, Tanzania.

Kapinga, D and I. Ruyobya (1994): Literacy and Education. *1988 Population Census, National Profile.* Population of Tanzania: 1988. Dar es Salaam: Bureau of Statistics, United Republic of Tanzania.

Kapinga, S.H., D.J. Hunter, and G. Natchtigal (1992): Reproductive Knowledge and Contraceptive Awareness and Practice Among Secondary School Pupils in Bagamoyo and Dar es Salaam ,Tanzania. *Central African Journal of Medicine*, 38(9):375-380.

Karanja, Wambui. 1987. Outside Wives and Inside Wives in Nigeria: A Study of Changing Perceptions in Marriage. Nairobi, Kenya.

Kiernan, K.E. (1977): Age at Puberty in Relation to Age at Marriage and Parenthood: A National Longitudinal Study. *Annals of Human Biology* 4:301-320.

Knodel, J. (1977): Age Patterns of Fertility and the Fertility Transition: Evidence from Europe and Asia. *Population Studies*, 31(2):219-249.

Komba, A. and C.L. Kamuzora (1988): Fertility Reduction due to Non-Marriage and Lactation: A Case Study of Kibaha District, Tanzania. *African Population Conference*. Dakar, Senegal: IUSSP.

Konje, J.C., K.A. Obisesan, and O.A. Ladipo (1992): Health and economic consequences of septic induced abortion. *International Journal of Gynecology and Obstetrics* 37(3):193-197.

Konogolo, L. (1985): Variation in Entry into Motherhood and Length of Effective Reproductive Life among Women in Kenya. *Studies in African and Asian Demography*. CDC Annual Seminar.

Kpedekpo, G.M.K. (1982): *Essentials of Demographic Analysis for Africa*,Heinemann, USA.

Kulin, H.E. (1988): Adolescent Pregnancy in Africa: A Programmatic Focus. *Social Science and Medicine,* 26 (7):727-735.

Ladipo, O.A. (1990): Unsafe abortion in the Third World. *International Journal of Gynecology and Obstetrics* (Suppl. 3): 21-28.

Larsen, U. and J. Menken (1991): Individual-level Sterility: A New Method of Estimation with Application to Sub-Saharan Africa. *Demography*, 28(2):229-247.

Laurie, S. (1986): Age of Physical Maturation and First Intercourse in Black Teenage Males and Females. *Demography* 23(4):595-598.

Leke, R.J. (1989): Commentary on unwanted pregnancy and abortion complications in Cameroon. *International Journal of Gynaecology and Obstetrics*. Supplement 3:33-35.

Leshabari, M.T., S.F. Kaaya and F. Kawau (1997): Reproductive Health Knowledge, Premarital Sex and Other Problem Behaviour Among School Youth in Rombo District, Kilimanjaro Region, Tanzania. A research report submitted to the Ford Foundation, Nairobi, Kenya.

Lesthaeghe, R., H.J. Page and O. Adegbola (1981a): Child-Spacing and Fertility in Lagos. *Child-Spacing in Tropical Africa: Traditions and Change*, Hilary Page and Ron Lesthaeghe (eds.):147-180. London: Academic Press.

Lesthaeghe, R., I.H. Shah, and H.J. Page (1981b): Compensating Changes in Intermediate Fertility Variables and the Onset of Marital Fertility Transition. *IUSSP General Conference*, Manila vol.1: 413-432, Ordina, Liege.

Lesthaeghe, Ron, P.O. Ohadike, J. Kocher and H.J. Page (1981c): Child-Spacing and Fertility in Sub-Saharan Africa: An Overview of Issues. *Child-Spacing in Tropical Africa: Traditions and Change*, Hilary Page and Ron Lesthaeghe (eds.):3-23. London: Academic Press.

Likwa, R.N. and M. Whittaker (1995): The Characteristics of Women Presenting for Abortion and Complication of Illegal Abortions at the University Teaching Hospital, Lusaka, Zambia: An explorative study. (Unpublished).

Liskin, L.S. (1992): Maternal morbidity in developing countries: A review and comments. *International Journal of Gynecology and Obstetrics* 37(2):77-87.

Lowe, C.V. (1977): Health Implications of Adolescent Pregnancy. In *Adolescent Fertility: The Procceedings of an International Conference*, Donald J. Bogue, (eds.):55-59. Chicago: Community and Family Study Center, University of Chicago.

Lucas, D. (1980): Fertility. *Beginning Population Studies*, D. Lucas, P. McDonald, E. Young and C. Young (eds.):45-59. Canberra: Australian National University.

Lwihula G., K. Nyamuryekunge, and C. Hamelmann (1996): Baseline Survey of Sexual and Reproductive Health Knowledge, Perceptions and Behaviour Among School Youths in Kinondoni District. Research report submitted to African Medical Research Foundation (AMREF) Dar es Salaam.

Macro International Website (1998): www.macroint.com/dhs/indicator/datasearch.asp (03.10.98).

Madihi, M.C.D. (1988): The Influence of Female Labour Force Participation on Contraceptive Practices: The case of Married Women in Dar es Salaam. *M.A dissertation*, University of Dar es Salaam.

Marini, M.M. and P.J. Hodson (1981): Effect of the Timing of Marriage and First Birth on the Spacing of Subsequent Births. *Demography* 18 (4):517-530.

Maro, P.S. (1974): Population and Land Resources in Northern Tanzania: The Dynamics of Change, 1920-1970. *Unpublished Doctoral Thesis*. Minneapolis, U.S.A.: University of Minnesota.

Mashalaba, N.N. (1989): Commentary on the Causes and Consequences of Unwanted Pregnancy from an Afican Perspective. *International Journal of Gynecology and Obstetrics*, Suppl.3:15-19.

Mauldin, W.P. and S.J. Segal (1988): Prevalence of Contraceptive Use: Trends and Issues. *Studies in Family Planning*, 19(6)335-353.

Maxwell, N.L. (1987): Influence on the Timing of First Child bearing. *Contemporary Policy Issues* 4:113-120.

Mbago, M.C.Y. (1996): Some Factors Associated with the Use of Modern Family Planning Methods in Tanzania: A case Study of Eight Regions. *Tanzanian Journal of Population Studies and Development* 3(1&2):53-64.

McCauley, A.P. and C. Salter (1995): Meeting the needs of young adults. *Population Reports*, Series J, (41). Baltimore, Johns Hopkins School of Public Health, Population Information Program.

McDevitt, T. (1996): *Trends in Adolescent Fertility and Contraceptive Use in the Developing World.* US Bureau of the Census Report IPC/95_1. Washington, DC: US Government Printing Office.

McLaurin, K.E., C.E. Hord, and C.E. Wolf (1991): *Health Systems' Role in Abortion Care: The need for a pro-active approach*. IPAS International Projects Assistance Services, Carrboro, North Carolina.

McNeilley, A.S. (1993): Breastfeeding and Fertility. *Biomedical and Demographic Determinants of Reproduction*, R. Gray, H. Leridon and A. Spira (eds.):391-412. Oxford: Clarendon Press.

Meekers, D. (1990): Consequences of Premarital Child bearing in Ivory Coast. Paper Presented at the Annual Meeting of the Population Association of America, Toronto, Canada, May 2-5.

Meekers, D. (1991): The Effect of Imputation Procedures on First Birth Intervals: Evidence from Five African Fertility Surveys. *Demography*, 28(2):249-260.

Meekers, D. (1992): The Process of Marriage in African Societies: A Multiple Indicator Approach. *Population and Development Review* 18(1):61-78.

Meekers, D. (1993): Sexual Initiation and Premarital Childbearing in Sub-Saharan Africa. *DHS Working Papers (5)*. Macro International Inc. Columbia, Maryland, USA.

Meekers, D. (1994): Sexual Initiation and Premarital child bearing in Sub-Saharan Africa. *Population Studies*, 48(1):47-64.

Ministry of Health (Tanzania) (1989): *The National Family Planning Programme: Plans of Operations 1989-1993*. Dar es Salaam: United Republic of Tanzania.

Ministry of Health (Tanzania) (1993): *Tanzania Family Planning Situation Analysis Study*. Nairobi: Population Council.

Mirembe, F.M. (1994): A Situational Analysis of Induced Abortion in Uganda. Paper presented at the conference on Unsafe Abortion and Post-abortion Family Planning in Africa, Mauritius, 24-28 March.

Mpangile, G.S., M.T. Leshabari, and D.J. Kihwele (1993): Factors associated with induced abortion in public hospitals in Dar es Salaam, Tanzania. *Reproductive Health Matters*, 2:21-31.

Mpiti A. and I. Kalule-Sabiti (1985a): The proximate Determinants of Fertility in North Sudan. *WFS Scientific Reports* (73).

Mpiti, A.M. and I. Kalule-Sabiti (1985b): The Proximate Determinants of Fertility in Lesotho. *WFS Sientific Reports* (78).

Mturi A.J. and P.R.A. Hinde (1994): Fertility Decline in Tanzania. *Journal of Biosocial Science* 26(1):529-538.

Mturi A.J. and P.R.A. Hinde (1995): "Recent Demographic Change in Tanzania: Causes, Consequences and Future Prospects." *Journal of International Development*, 7(1):117-134.

Mturi, A..J. (1996): Patterns of Fertility and Contraceptive use in Tanzania. *Unpublished Doctoral Thesis*. University of Southampton, United Kingdom.

Mulder, M.B. (1989): Marital Status and Reproductive Performance in Kipsigis Women: Re-evaluating the Polygyny-Fertility Hypothesis. *Population Studies*, 43(2):285-304.

Muna, D.S.R.M. (1987): Factors Affecting Contraceptive Level in Morogoro Urban District. *M.A dissertation*, University of Dar es Salaam.

Muroki, F. (1988): Age at Menarche, Prevalence of Menstrual Pain and Attitude to Menerche in Luhya Schoolgirls in Kakamega District, Kenya. *Unpublished Masters of Medicine thesis*, University of Nairobi, Kenya.

Mutambirwa, J. (1990): Aspect of Sexual Behavior in Local Cultures and the Transmission of Sexual Transmitted Diseases (STDs) Including HIV. Paper presented at the IUSSP Seminar on Anthropological Studies Relevant to the Sexual Transmission of HIV, Sonderborg, Denmark, November 19-22.

Muze, M.S. (1980): *Basic Facts about Education in Tanzania*. Dar es Salaam, Tanzania: Ministry of Education.

Mwateba, R., J.M. Paxman and D.C. Weil (1988): Confronting and the Consequences of Schoolgirl Pregnancy in Tanzania: Lessons from the Multidisciplinary Approach of Dar es Salaam Youth Centre. Paper presented at the Annual Meeting of the American Public Health Association, November 13-17.

Nanyaro, P. (1992): The effect of Socio-economic Factors on Contraception and Unmet need for Family Planning Methods. A case study of Dodoma Region. *M.A dissertation*, University of Dar es Salaam.

National Research Council (1989): *Contraception and Reproduction: Health Consequences for Women and Children in the Developing World*. Washington D.C.: Academy Press.

National Research Council (1993): *Demographic Effects of Economic Reversals in Sub-Saharan Africa*. Washington D.C.: National Academy Press.

Ngalinda, I.F.N. (1991): Levels, Patterns and Differentials of Fertility in Tanzania. *published M.A Thesis*, RIPS University of Ghana.

Ngallaba, S., S.H. Kapiga, I. Ruyobya and J.T. Boerma (1993): *Tanzania Demographic and Health Survey 1991/1992*. Dar es Salaam, Tanzania: Bureau of Statistics and Maryland, USA: Macro International Inc.

Nichols, D., O.A. Ladipo, J.M. Paxman, and E.O. Ololorin (1986): Sexual Behavior, Contraceptive Practice, and Reproductive Health among Nigeriaan Adolescents. *Studies in Family planning* 17(2):100-106.

Njau, P.W. and V.M. Lema (1988): *A Review of Research in Adolescent Fertility in Kenya*. Centre for the Study of Adolescence, Nairobi, Kenya.

Njogu, W. (1991): Trends and Determinants of Contraceptive Use in Kenya. *Demography*, 28(1):83-99.

Njogu, W. and T.C. Martin (1991): Fertility Decline in Kenya: The Role of Timing and Spacing Births. *Demographic and Health Surveys World Conference*, August, 5-7, Washington D.C.. Proceedings, Volume III:1883-1901.

Nortman, D. (1982): Measuring the Unmet Need for Contraception to Space and to Limit Births. *International Family Planning Perspectives*, 8(4):125-134.

Ntozi, J.P.M. and M. Lubega (1990): Patterns of Sexual Behaviour and the Spread of AIDS in Uganda. Paper presented at the IUSSP Seminar on Anthropological Studies Relevant to the Sexual Transmission of HIV, Sonderborg, Denmark, November 19-22.

Nyerere, J.K. (1967): *The Arusha Declaration*. Dar es Salaam: Government Printer.

Obbo, C. (1987): The Old and the New in East Africa Elite Marriages. David Parkin and David Nyamwaya, (eds.):263-280. Nairobi, Kenya.

Ocholla-Ayayo, A.B.C., V. Lema, R.O. Obudho, Z. Muganzi, Dr. Suda, Mrs. Njau, A.A. Khasakhala, and Mr. Pitchar (1990): *Sexual Practice and the Risk of the Spread of STDs and AIDS in Kenya.* Task force on sex practices and the risks of STDs and AIDS in Kenya, World Health Organization, and Population Studies and Research Instititute, University of Nairobi, Kenya.

Ohadike, P.O. (1979): Socio-economic, Cultural, and Behavioural Factors in Natural Fertility. *Natural Fertility.* Leridon, H . and J. Menken (eds.):287-310. IUSSP.

Okonofua, F.E., U. Onwudiegwu, and O.A. Odunsi (1992): Illegal Induced Abortion: A study of 74 cases in Ile-Ife, Nigeria. *Tropical Doctor* 22(2):75-78.

Omari, C.K. (1989): *Socio-cultural Factors in Modern Family Planning Methods in Tanzania*. Lewinston, NY, U.S.A.: The Edwin Mellen Press.

Oppong, C. (1987): Responsible Fatherhood and Birth Planning. *Sex Roles, Population and Development in West Africa,* Christine Oppong (eds.):165-178. Portsmouth (N.H.): Heinemann and London: James Currey.

Page, H.J. (1988): Fertility and Family Planning in Sub-Saharan Africa. *The State of African Demography*, E. van de Walle, P.O. Ohadike and M.D. Sala-Diakanda (eds.):29-45. Liège, Belgium: IUSSP.

Paxman, J.M., A. Rizo, L. Brown, and J. Benson (1993): The Clandestine Epidemic: The Practice of Unsafe Abortion in Latin America. *Studies in Family Planning* 24(4):205-226.

Pebley, A.R. (1981): Changing Attitudes Toward the Timing of First Births. *Family Planning Perspectives* 13(4):171-175.

Pillai, G. (1993): Reducing Deaths from Pregnancy and Childbirth. *Health and Development Report* 9(5):11-13.

Planning Commission (1992): *National Population Policy*. President's Office, United Republic of Tanzania.

Population Reference Bureau (1998): *World Population Data Sheet 1998*. PRB Inc., Washington DC.

Presser, H.B. (1978): Age at Mernache, Socio-Sexual Behaviour, and Fertility. *Social Biology* 25:94.

Rao, K.V. and T.R. Balakrishnan (1988): Age at First Birth in Canada: A Hazards Model Analysis. *GENUS* 44(1-2):53-72.

Reining, P. (1972): *The Haya of north-western Tanzania*. East African Publishing House, Nairobi, Kenya.

Reinis, K.I. (1992): The Impact of the Proximate Determinants of Fertility: Evaluating Bongaarts' and Hobcraft and Little's Methods of Estimation. *Population Studies*, 46:309-326.

Retherford, R.D. and M.K. Choe (1993): *Statistical Models for Causal Analysis*. London: John Wiley & Sons.

Robey, B., S.O. Rutstein, and L. Morris (1992): The Reproductive Revolution: New Survey Findings. *Population Reports*, Series M, Number 11.

Robinson, W. and J. Cleland (1992): The influence of contraceptive costs on the Demand for children. In *Family Planning Programs and Fertility,* (eds.): 115-124. Phillips and Ross. Oxford: Clarendon Press.

Robinson, W.C. (1992): Kenya Enters the Fertility Transition. *Population Studies*, 46:445-457.

Rodriguez, G. and J.N. Hobcraft (1980): Illustrate Analysis: Life Table Analysis of Birth Intervals in Columbia. *WFS Scientific Reports* (16).

Rogo, K.O. (eds.) (1986): *Adolescent Fertility: Proceedings of a workshop held at Kwale, Coastal Province, Kenya.* August. Unpublished.

Rogo, K.O. and J.M. Nyamu (1989): Legal Termination of Pregnancy at the Kenyatta National Hospital Using Postaglandin F2a in Midtrimester. *East African Medical Journal* 66 (5):333-339.

Ross, J.A. and E. Frankenberg (1993): *Findings from Two Decades of Family Planning Research*. Population Council, New York.

Rutenberg, N. and I. Diamond (1993): Fertility in Botswana: the recent decline and future prospects, *Demography*, 3(2):143-157.

Rutenberg, N., M. Ayad, L.H. Ochoa, and M. Wilkinson (1991): Knowledge and Use of Contraception. *Demographic and Health Surveys Comparative Studies* No. 6, Columbia, Maryland, USA: Institute for Resource Development/Macro International Inc.

Rutstein, S.O. and G.T. Bicego (1990): Assessment of the Quality of Data Used to Ascertain Eligibility and Age in the Demographic and Health Surveys. *An Assessment of DHS-I Data Quality*, 5-37. DHS Methodological Reports, No.1. Columbia, Maryland: Institute for Resource Development/Macro Systems, Inc.

Ryder, N.B., and C.F. Westoff (1971): *Reproduction in the United States, 1965*. Princeton: Princeton University Press.

Saha, T. and G. Mboup (1992): *Data Evaluation: Age at First Union*. Calverton, Maryland: Macro International Inc.

Salter, C., H.B. Johnston, and N. Hengen (1997): Care for Post-Abortion Complications: Saving Women's Lives. *Population Reports Series* L, No. 10. Baltmore: Johns Hopkins University Population Information Program.

Sawaya, M. (1995): School Dropouts and Related Problems in Tanzania. Paper presented at a workshop on the Youth and Related Problems in Tanzania. Kilimanjaro Hotel, October 1995.

Schoenmaeckers, R., I.H. Shah, R. Lesthaeghe, and O. Tambashe (1981): The Child-Spacing Tradition and the Postpartum Taboo in Tropical Africa: Anthropological Evidence. *Child-Spacing in Tropical Africa: Traditions and Change*. Hilary J. Page and Ron Lesthaeghe (eds.):25-71. London: Academic Press.

Shah, N.M. and T. Ahmed (1982): The Unmet Need for Contraception in Pakistan: A Review of Program Targets. *International Family Planning Perspectives*, 8(1):33-39.

Sherris, J.D., K.A. London, S.H. Moore, J.M. Pile, and W.B. Watson (1985): The Impact of Family Planning Programs on Fertility. *Population Reports*, Series J, Number 29.

Singh, S. and D. Wulf (1991): *Today's Adolescents, Tomorrow's Parents: A Portrait of the Americas.* New York: The Alan Guttmacher Institute.

Singh, S. and D. Wulf (1994): Estimated Levels of Induced Abortion in Six Latin American Countries. *International Family Planning Perspectives* 20(1)4-13.

Somoza, J.L. (1981): An Evaluation of Analysis of Detecting Data, Proceedings of the IUSSP Conference, Manila.

Stolnitz, G.J. (1983): *Urbanization and Rural-to-Urban Migration in Relation to LDC Fertility*. Project Paper no. 10. Bloomington, U.S.A.: Indiana University.

Stubblefield, P.G. and D.A. Grimes (1994): Septic abortion. *New England Journal of Medicine* 331(5):310-314.

Sweet, R.L. and R.S. Gibbs (1990): Post-abortion Infection and Septic Shock. In: *Infectious Diseases of the Female Genital Tract*. 2nd ed. Baltimore, Williams & Wilkins.

Thomas, D. and I. Muvandi (1994): The Demographic Transition in Southern Africa: Another Look at the Evidence from Botswana and Zimbabwe. *Demography* 31(2):185-207.

Trussell, J and K.I. Reinis (1989): Age at First Marriage and Age at First Birth. *Population Reports* 4(1):126-193.

Turner R. (1992): Russian fertility is low, despite early age at first birth and lack of effective contraceptive methods. *Family Planning Perspectives* 24(5):236-7.

Udry, R.J. (1979): Age at Menarche, at First Intercourse and at First Pregnancy. *Journal of Biosocial Science* 11:433-441.

UMATI (1992): *Revised Work Programme Budget 1993*. Dar es Salaam, Tanzania: Chama cha Uzazi na Malezi Bora Tanzania.

United Nations (1963): *Population Bulletin.* Department of Social and Economic Affairs No. 7, New York.

United Nations (1967): *Methods of Estimating Basic Demographic Measures for Incomplete Data.* Population Studies 42. (Manual IV), New York.

United Nations (1983): *Indirect Techniques for Demographic Estimation,* (Manual X), Sales No.E.83, 13.2, New York.

United Nations (1985): *Women's Employment and Fertility: A Comparative Analysis of World Fertility Survey Results for 38 Developing Countries*. New York: Department of International Economic and Social Affairs, Population studies no. 96.

United Nations (1987): *Fertility Behaviour in the Context of Development: Evidence from the World Fertility Survey,* (ST/ESA/SER:A/86). New York.

United Nations (1988): *First marriage: Patterns and Determinants*. New York.

United Nations (1989): *Case Studies in population Policy: United Republic of Tanzania*. Department of International Economic and Social affairs, Population policy Paper No. 22. ST/ESA/SER.R/91. New York: United Nations.

United Nations (1995): *Population and Development. Programme of Action Adopted at the International Conference on Population and Development, Cairo, 5-13 September 1994.* New York: United Nations.

United Nations (ECA) (1983): Nuptiality and Fertility. *African Population Studies Series* No. 5. Addis Ababa.

United Nations Population Fund (UNFPA) (1993): Fertility Research. *Readings in Population Research Methodology,* Vol. 5. Social Development Center, Chicago, Illinois.

United Republic of Tanzania (1969): *Second five-year Plan for Economic and Social Development*. Dar es Salaam: Government Printer.

United Republic of Tanzania (undated): *Population and Development in Tanzania: Presentation and Report*. Dar es Salaam: Population Planning Unit & Bureau of Statistics, Planning Commission and National Family Planning Programme, Ministry of Health.

United Republic of Tanzania/UNICEF (1990): *Women and Children in Tanzania, A Situation Analysis*. Dar es Salaam, Tanzania.

Vaessen, M. (1984): Childness and infecundity. *WFS Comperative Studies* (31). Voorburg, Netherlands: International Statistical Institute.

van de Walle, E. (1993): Recent Trends in Marriage Ages. *Demographic Change in Sub-Saharan Africa*, K.A. Foote, K.H. Hill and L.G. Martin (eds.):117-152. Washington, D.C.: National Academy Press.

van de Walle, E. and A. Ebigbola (1987): *The Cultural Roots of African Fertility Regimes*. Proceedings of the Ife Conference, February 25-March 1, Obafemi Awolowo University and University of Pennsylvania.

van de Walle, E. and A.D. Foster (1990): Fertility Decline in Africa: Assessment and Prospects. *World Bank Technical Paper* (125). Washington D.C.: The World Bank.

van de Walle, E. and F. van de Walle (1993): Post-Partum Sexual Abstinence in Tropical Africa. *Biomedical and Demographic Determinants of Reproduction*. R. Gray, H. Leridon and A. Spira (eds.):446-460. Oxford: Clarendon Press.

van de Walle, E. (1968): Marriage in African censuses and inquiries. In William Brass et al., *The Demography of Tropical Africa*. Princeton: Princeton University Press:183-238.

van de Walle, F. and K. Omideyi (1988): The Cultural Roots of African Fertility Regimes. *African Population Conference*. Dakar, Senegal: IUSSP.

van Ginneken, J.K. (1978): The Impact of Prolonged Breast-feeding on Birth Intervals and Postpartum Amenorrhea. *Nutrition and Human Reproduction*. W.H. Mosley (eds.):179-195. New York: Plenum Press.

Veevers, J.E. (1972): Declining Childlessness and Age at Marriage: A Test of a Hypothesis. *Social Biology* 19:285-288.

Venkatacharya, K. and T. Teklu (1987): A simplified Robust Estimate of the Birth Rates. *Asian and Pacific Population Forum* 4:9-24.

Venkatacharya, K. and T. Teklu (1991): *Estimation of Birth Rate and Related Measures in Sub-Saharan Africa*. RIPS Monograph Series (4).

Waite, L. and K. Moore (1978): The Impact of an Early First Birth on Young Women's Educational Attainment. *Social Forces* 56:845-865.

Weinberger, M., C. Llody, and A.K. Blanc (1989): Women's Education and Fertility: A decade of Change in Four Latin America Countries. *International Family Planning Perspectives* 15(1):1-20.

Weinstein, K.I., S. Ngallaba, A.R. Cross and F.M. Mburu (1995): *Tanzania Knowledge, Attitudes and Practices Survey 1994*. Dar es Salaam, Tanzania: Bureau of Statistics, Planning Commission and Calverton, U.S.A.: Demographic and Health Surveys, Macro International Inc.

Weisberg, S. (1985): *Applied Linear Regression*. New York: John Wiley & Sons.

Westoff, C.F. (1988): The Potential Demand for Family Planning: A New Measure of Unmet Need and Estimates for Five Latin American Countries." *International Family Planning Perspectives*, 14(2):45-53.

Westoff, C.F. (1992): Measuring the Unmet Need for Contraception: Comment on Bongaarts. *Population and Development Review*, 18(1):123-125.

Westoff, C.F. and A.R. Pebley (1981): Alternative Measures of Unmet Need for Family Planning in Developing Countries. *International Family Planning Perspectives*, 7(4):126-136.

Westoff, C.F. and L. Moreno (1992): The Demand for Family Planning: Estimates for Developing Countries. *Family Planning Programmes and Fertility*, Phillips, J.F. and J.A. Ross. (eds.):141-158. Oxford: Clarendon Press.

Westoff, C.F. and L.H Ochoa (1993): Unmet Need and the Demand for Family Planning in Kenya. *DHS Working Papers* (4). Columbia, Maryland, Macro International, Inc.

Westoff, C.F. and L.H. Ochoa (1991): Unmet Need and the Demand for Family Planning. *DHS Comparative Studies* (5). Calverton, Maryland: Macro International Inc.

Westoff, C.F., A.K. Blanc, and L. Nyblade (1994): Marriage and Entry into Parenthood. *DHS Comparative Studies* (10). Calverton, Maryland: Macro International Inc.

World Bank (WB) (1996): *Improving women's health in India*. Washington, D.C., WB.

World Fertility Survey (1977): *Strategies for Analysis of WFS Data*. Basic Documentation, (9).

World Health Organization (WHO) (1994): *Care of mother and baby at the health centre: A practical guide*. Geneva.

World Health Organization (WHO) (1994): *Maternal Health and Safe Motherhood Programme*. Abortion: A tabulation of available data on the frequency and mortality of unsafe abortion. 2nd ed. Geneva, WHO.

World Health Organization (WHO) (1995): *Complications of abortion: Technical and managerial guidelines for prevention and treatment*. Geneva.

Yoseph, S. and G. Kifle (1988): A six-year review of maternal mortality in a teaching hospital in Addis Ababa. *Ethiopian Medical Journal* 26(3):115-120.

Zaba, B. (1981): *Use of the Relational Gompertz Model in Analysing Fertility Data Collected in Retrospective Surveys*. Centre for Population Studies, Working Papers 81-82, London School of Hygiene and Tropical Medicine.

Zachariah, K.C. (1970): An Alternative Approach to the Problem of Adjusting Birth Rates Estimated by the Stable Population Method for the Effect of Declining in Mortality. Demographic Measures and Population Growth in Arab Countries. Cairo Demographic Centre Research Monograph, Series (1).

Zelnik, M. (1981): Determinants of Fertility Behaviour Among U.S. Female Aged 15-19, 1971 and 1976. Final Report, Contract NO1-HD-82848. Baltimore: Johns Hopkins University.

10. Appendix

Table A- 1: Summary of mean age at first sexual intercourse, marriage, and birth including TFR and contraceptive use in sub-Saharan Africa countries and selected developing countries

Country	*Year*	*AFSI*	*AFM*	*AFB*	*TFR*	*CPR*
Benin	1996	16.2	17.7	18.8	6.3	4.0
Central African Republic	1994	15.4	16.3	18.1	5.1	3.8
Comores	1996	16.9	17.4	19.2	5.1	12.8
Côte d'Ivoire	1994	15.1	17.1	17.6	5.7	5.0
Ghana	1993	16.4	18.1	19.1	5.5	11.4
Kenya	1993	16.0	17.9	18.3	5.4	30.8
Mali	1995	15.5	15.6	17.9	6.7	5.3
Tanzania	1996	16.0	17.4	18.4	5.8	15.3
Uganda	1995	15.4	16.6	17.7	6.9	9.6
Zambia	1996	15.6	17.0	17.9	6.1	17.2
Zimbabwe	1994	17.5	18.1	18.7	4.3	48.0
Egypt	1995	-	18.3	20.0	3.6	50.9
Bangladesh	1996	-	13.9	16.8	3.3	39.7
Brazil	1996	17.8	19.5	20.6	2.5	74.3
Dominican Republic	1996	17.2	17.9	19.5	3.2	65.2

Source: calculated from DHS III

Table A- 2: Contraceptive use method with current age of a user

Current age	*Pill*	*IUD*	*Injec-tions*	*Diaphragm/ Foam/Jelly*	*Con-dom*	*Female Steril-isation*	*Norp-lant*	*Periodic Abstinence*	*With-draw al*	*Other*	*N*
15-19	26.8	3.7	12.2	1.2	22.0	1.2	0.0	23.2	8.5	1.2	82
20-24	36.5	1.7	20.9	0.0	12.3	0.3	0.3	12.0	15.0	1.0	301
25-29	40.9	1.7	21.3	0.0	8.0	1.0	0.0	13.6	11.2	2.1	286
30-34	29.6	4.7	28.3	0.0	4.3	3.9	0.0	13.3	13.7	2.1	233
35-39	22.0	4.8	29.6	0.0	3.2	14.5	1.1	12.4	9.1	3.2	186
40-44	14.2	1.4	23.4	0.0	5.0	32.6	0.0	9.9	8.5	5.0	141
45-49	11.8	5.3	14.5	0.0	5.3	40.8	0.0	6.6	9.2	6.6	76
15-49	**29.7**	**3.0**	**22.9**	**0.1**	**8.0**	**9.0**	**0.2**	**12.8**	**11.6**	**2.5**	**1,305**

Source: calculated from 1996 TDHS

Table A- 3: Regression results of the relationship between fertility and selected variables

POR	*Factor*	*Variable*	*Moslem*	*Catholic*	*Protestant*	*None*
Dar		Constant	1.128*	1.280	1.735	
	Age	15-19				
		20-24	0.686	1.705	0.775	
		25-29	1.838***	3.330	1.528	
		30-34	2.541***	2.201	0.274	
		35-39	3.891***	4.774*	5.962*	
		40-44	4.360***	8.394**		
		45-49	4.137***	3.837	4.790	
	Age at first sexual intercourse	<15				
		At union	0.423	-2.135	-0.487	
		15-17	0.163	-0.210	-0.296	
		18-19	0.234	-0.167	0.076	
		20-21	0.117	-1.846	1.418	
		22-24	-0.119	-1.629		
		25+	0.249	0.127		
	Age at first marriage	<15				
		15-17	0.171	-4.957	-5.094	
		18-19	0.256	-3.963	-4.569	
		20-21	0.877*	-4.358	-4.692	
		22-24	0.620	-2.743	-6.831	
		25+	0.984	-4.146	-3.203	
	Age at first birth	<15				
		15-17	-0.374			
		18-19	-0.761	0.350	-1.187	
		20-21	-1.590***	0.313	-1.183	
		22-24	-1.787***	-1.707	-1.074	
		25+	-3.870**	-3.317	-0.381	
	Marital status	Never married				
		Currently married	0.466	3.347	5.244	
		Widowed	-1.102	0.838	4.183	
		Divorced	0.030	2.327		
		Not living together	0.197	3.225		
	Polygyny	Monogamous				
		Polygamous	0.331	-1.156	-1.008	
	Woman's educational level	None				
		Primary incomplete	0.367	-0.142	-1.744	
		Primary complete	0.024	-1.599		
		Secondary+	0.244	-0.340	-0.874	
	Partner's educational level	None				

POR	*Factor*	*Variable*	*Moslem*	*Catholic*	*Protestant*	*None*
		Primary incomplete	-0.550	2.168	3.657	
		Primary complete	-0.345	0.752	-0.299	
		Secondary +	-0.678	1.745		
	Child loss	none				
		1	0.244	1.576	0.671	
		2	0.914*	3.681		
		3	2.478***		9.401*	
		4+	3.337***			
Urban	*Constant*		0.517	0.908	0.334	
	Age	15-19				
		20-24	0.562	1.057*	0.868	
		25-29	1.790***	2.229***	2.573***	
		30-34	2.965***	3.361***	3.232***	
		35-39	3.553***	4.396***	4.414***	
		40-44	3.686***	5.148***	5.047***	
		45-49	4.030***	4.975***	6.101***	
	Age at first sexual intercourse	<15				
		At union	1.140***	0.017	1.262**	
		15-17	0.843**	0.160	0.459	
		18-19	0.670*	-0.225	0.672	
		20-21	0.633	0.223	0.676	
		22-24	0.367	0.125	0.730	
		25+	1.564	-0.080	0.914	
	Age at first marriage	<15				
		15-17	-0.303	-0.476	0.622	
		18-19	-0.643*	-0.601	0.744	
		20-21	-0.543	-0.536	0.819	
		22-24	-0.350	-1.310*	0.213	
		25+	-0.039	-1.944**	-0.737	
	Age at first birth	<15				
		15-17	-0.816*	-0.139	-0.100	
		18-19	-0.848*	-0.384	-0.247	
		20-21	-1.032*	-1.039	-1.182	
		22-24	-2.213***	-1.372*	-1.387	
		25+	-3.311***	-1.885*	-1.684	
	Marital status	Never married				
		Currently married	1.609**	1.753*	0.032	
		Widowed	0.837	2.130**	-0.336	
		Divorced	0.926	1.192	-2.071	
		Not living together	2.073**	0.622	0.627	
	Polygyny	Monogamous				
		Polygamous	0.142	-0.584*	0.328	
	Woman's educational level	None				
		Primary	0.347	0.087	-0.010	

POR	*Factor*	*Variable*	*Moslem*	*Catholic*	*Protestant*	*None*
		incomplete				
		Primary complete	0.212	-0.406	-0.662	
		Secondary+	0.446	-0.425	-0.594	
	Partner's educational level	None				
		Primary incomplete	-0.517	-0.846	0.566	
		Primary complete	-0.828**	-0.459	0.009	
		Secondary +	-0.756**	-0.634	-0.079	
	Child loss	none				
		1	0.132	0.887***	0.568*	
		2	1.555***	1.289***	1.403**	
		3	2.595***	2.343**	1.414	
		4+	4.324***	3.138***	6.033***	
Rural		constant	1.207***	1.201***	0.869**	0.639
	Age	15-19				
		20-24	0.657***	0.890***	0.952***	0.925*
		25-29	1.849***	2.204***	2.354***	2.214***
		30-34	2.908***	3.345***	3.624***	3.712***
		35-39	3.955***	4.425***	4.773***	5.013***
		40-44	4.618***	5.698***	5.642***	5.549***
		45-49	4.880***	5.952***	6.573***	6.841***
	Age at first sexual intercourse	<15				
		At union	0.494***	0.143	0.005	-0.074
		15-17	-0.076	-0.073	-0.083	0.062
		18-19	0.167	0.021	0.061	0.311
		20-21	-0.095	-0.533**	-0.087	0.451
		22-24	1.031*	-0.323	-0.056	-0.385
		25+	0.737	-0.951*	-0.238	-1.086
	Age at first marriage	<15				
		15-17	0.117	-0.003	0.242	-0.123
		18-19	-0.220	-0.110	0.063	-0.127
		20-21	-0.047	-0.004	0.093	-0.627
		22-24	-0.167	-0.328	0.134	-0.778*
		25+	-0.886***	-0.787***	-0.609*	-1.257**
	Age at first birth	<15				
		15-17	-0.224	-0.194	-0.343	-0.144
		18-19	-0.597***	-0.661***	-0.702**	-0.783*
		20-21	-0.797***	-0.985***	-1.351***	-0.583
		22-24	-1.227***	-1.474***	-1.910***	-1.59***
		25+	-2.575***	-1.874***	-2.706***	-2.07***
	Marital status	Never married				
		Currently married	0.471*	0.552*	1.010***	0.832
		Widowed	-0.162	-0.086	0.341	-0.422
		Divorced	0.009	-0.712**	0.107	-0.629
		Not living together	0.067	-0.186	0.592	-0.211

POR	*Factor*	*Variable*	*Moslem*	*Catholic*	*Protestant*	*None*
	Polygyny	Monogamous				
		Polygamous	-0.049	-0.192*	-0.394***	-0.031
	Woman's educational level	None				
		Primary incomplete	-0.061	-0.003	0.091	0.173
		Primary complete	-0.205*	-0.061	-0.096	0.035
		Secondary+	0.222	-0.279	-0.294	
	Partner's educational level	None				
		Primary incomplete	-0.010	-0.017	0.130	0.537**
		Primary complete	-0.203	0.102	-0.222	0.354
		Secondary +	-0.178	-0.203	-0.094	0.572
	Child loss	none				
		1	0.686***	0.411***	0.384***	0.595**
		2	1.681***	1.265***	1.100***	1.358***
		3	2.644***	2.194***	1.191***	1.578***
		4+	3.548***	3.288***	2.809***	2.043***

Source: calculated from 1996 TDHS

Table A- 4: Unstandardised coefficients of regression analysis of the relationship between age at first birth and selected variables

POR		*Moslem*	*Catholics*	*Protestant*
Dar	(Constant)	9.3***	8.0**	12.2*
	Education in single years	0.2***	0.0	0.0
	Current age - respondent	0.0	0.0	0.0
	Age at first intercourse	0.4***	0.6***	0.3
Urban	(Constant)	6.7***	6.0***	7.4***
	Education in single years	0.2**	0.0	0.1*
	Current age - respondent	0.0	0.1*	0.0
	Age at first intercourse	0.6***	0.7***	0.6***
Rural	(Constant)	11.0***	9.7***	9.7***
	Education in single years	0.1**	0.1***	0.0
	Current age - respondent	0.1***	0.0***	0.0***
	Age at first intercourse	0.3***	0.4***	0.5***

Source: calculated from 1996 TDHS

Eidesstattliche Erklärung

Ich erkläre hiermit an Eides statt, daß die vorliegende Dissertation von mir selbst und ohne die unzulässige Hilfe Dritter verfaßt wurde, auch in Teilen keine Kopie anderer Arbeiten darstellt und die benutzten Hilfsmittel sowie die Literatur vollständig angegeben sind.

Berlin, Dezember 1998